The Builder.

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The Thirlmere Scheme.

THE tenders for the first part of this great undertaking are to be sent in to the Chairman of the Manchester Waterworks Committee upon the 17th inst. Specifications and quantities have been prepared for some time past. The contract which it is intended to carry out forthwith will consist of about 5¾ miles of tunnelling and 1¼ mile of open cutting, with the necessary masonry and other work connected with the aqueduct. We intend giving a sketch of the whole of the proposed new works, briefly recapitulating, in the first place, the reasons which led up to the adoption of this scheme in preference to any other, referring, as a preliminary, to the existing and previous means of the supply of water to Manchester, and following it up by a statement of the extent to which a part of the Lake District is likely to be affected by the alterations which are now about to be carried out.

The first scheme for obtaining water for the Old Manchester and Salford Water Company, which was laid out in 1844, proposed to take water from the tributaries of both the Tame and the Etherow; but the mill-owners interested in the streams were so exacting, the compensation to them in water being fixed at a higher quantity than the promoters thought reasonable, that the Bill was abandoned.

An endeavour was made to obtain additional water from the new red sandstone at Gorton, for which purpose a shaft was sunk by Mr. Simpson, the late Engineer of the Chelsea Waterworks, and, at that time, the Engineer to the Manchester and Salford Water Company. The point selected being very favourably situated, it was hoped that a yield of at least 3,000,000 gallons per day would be obtained, but it never reached 1,000,000 gallons, and the ultimate regular yield was less than 700,000 gallons per day, although a pumping engine of 160 horse-power had been erected.

The Lancashire waterworks scheme was next set afloat, the object of which was to supply Bolton, Salford, and Manchester from the neighbourhood of Bolton; but this was successfully opposed by the Manchester Corporation, which decided to purchase the existing company and bring in a Bill themselves. Bolton, it may be remarked, has since carried out the proposal of the Lancashire Waterworks Company so far as it referred to itself. Mr. J. F. Bateman, who was consulted by the corporation, advised that the Tame should be abandoned and the Etherow, in the valley of Longdendale, wholly resorted to. The Act, however, was violently opposed by mill-owners; but an arrangement was ultimately come to with them, and the works were commenced late in 1848. Although the first drop of water from this district was brought into the city in 1850, the works were not finally completed till 1877. The construction of the five great reservoirs in Longdendale gave considerable trouble, owing to the dislocated character of the district, and the unretentive nature of the ground into which the puddle trenches of the reservoirs had to be sunk. Mr. Bateman has since somewhere remarked, referring to this difficulty, that "such embankments require knowledge and experience in their construction, and may easily become dangerous in the hands of unskilful persons." After the completion of the works, it was found that the gross quantity of water available for Manchester was 25,000,000 gallons per day. This was not the realisation of the original expectations, a result which was partly to be accounted for by the fact that districts from which additional water might have been collected had, in the meantime, been taken up by Stockport, Glossop, Oldham, Ashton, and Staleybridge. Since the commencement of the works, the consumption had gone on increasing to such an extent that it was necessary on their completion to consider the question of obtaining an increased supply. The few spots in the Penine-hills capable of yielding water, and which were not already taken up, were in immediate requisition for adjacent towns; and, had this not been the case, they were not sufficient for the demands of Manchester and the places dependent upon it for water. These places, some thirty-seven in number, have an aggregate population of upwards of 1,000,000 persons, who are, for the most part, people carrying on business in the city and living beyond its precincts, and who must, therefore, be regarded as its inhabitants. In this connexion, it will be interesting to refer to the rate of increase observed during five recent years in the consumption of water for domestic and trade purposes beyond the city in comparison with that which took place within the municipality. In the case of domestic consumption it was found to be 38·3 per cent., and in that used for trade purposes 24·8 per cent. of a higher rate beyond the boundary than that recorded within, which is a sufficient reply to any objection which might be made to the claims raised above. The rate of consumption in past years indicates that calculations as to future demands ought not to be made at less than 30 gallons per head per day upon the gross population to be supplied. In ten years the demand for Manchester and its immediate neighbourhood will probably reach 39,000,000 gallons per day; and in twenty years 50,000,000 gallons per day, and this is 25,000,000 gallons more than the present means of supply will yield. This large quantity cannot be obtained at a nearer point than the Lake district, and if it has to be brought so far, there is no more convincing argument why, once and for all, at least so far as the present generation is concerned, the future should not be anticipated in a sufficiently large spirit.

In 1874 Mr. Bateman was consulted by the Liverpool Water Committee about the extension of their supply. After going carefully into all the various suggestions of other engineers regarding the matter, he concluded by recommending Ulleswater and Haweswater, the scheme to be carried out as a joint undertaking with Manchester. He argued that eighty million gallons could be brought three-fourths of the way, and then forty millions branched off to Manchester, and the other forty million gallons taken on to Liverpool, so that it would only be a joint project for about three-fourths of the whole distance. This scheme was specially put forward on account of the purity of the water, the inexhaustible supply, and, particularly, as one which would not affect districts which properly belonged to towns whose funds would not allow of a large undertaking in obtaining a supply of water. If the Longdendale supply had reached its limit, here, at least, was one which might reasonably be considered limitless. But Liverpool refused to have anything to do with a joint affair. She was afraid that "the carrying out of a scheme in conjunction with Manchester might involve complicated arrangements." The immediate and pressing question for Manchester became, therefore, where, going independently, it could obtain in the best and cheapest way the necessary water. Mr. Grave, the chairman of the Water Committee, who resided in the Lake district, suggested Thirlmere. Mr. Bateman had already come to the conclusion that there was only one source from which a constant supply of good and wholesome water could be procured and depended upon. He represented the advisability in circumstances where it was proposed to incur a large outlay in bringing water a great distance, of providing for at least a supply of forty million gallons per day, and in that way anticipating the demands of the future, and not entertaining ideas of ultimate enlargement or additions, the latter being always very expensive. The proposal to go to Ulleswater and Haweswater, the other two possible sources from which a supply to Manchester and Liverpool could be obtained, in the event of a joint scheme being entertained, he now discarded in favour of Thirlmere,

which, he argued, was the best in every way to satisfy the requirements of Manchester. The elevation of each of the three lakes in question is as follows:—

Haweswater,	695 ft.	above	Ordn. datum.
Thirlmere	533	,,	,,
Ulleswater	477	,,	,,

Any one of these is high enough to supply water to Manchester by gravitation. Thirlmere, at little more than the same distance, and being 56 ft. higher than Ulleswater, had various other advantages to recommend it. The heaviest rainfall in the kingdom takes place at Thirlmere, a great bulk of the water flowing away in floods uselessly to the sea. There is sufficient for the wants of the district itself, and as much as Manchester, its neighbourhood, and the vicinity of the aqueduct are ever likely to require. The level of the lake can be raised to any desired height, with very little or no damage to existing property. In the case of Ulleswater being adopted, a tunnel, 8½ miles long, and in one place, at Kirlestone Pass, 1,000 ft. below the surface of the gronnd, would be required; whereas from Thirlmere its greatest depth would only be 270 ft. at Dunmail Raise, and the greatest length of tunnel would be between two and three miles. Another point to be noticed is the fact that the same quantity of water can be conveyed to Manchester for about 370,000*l.* less from Thirlmere than from Ulleswater. The other objections to Ulleswater may be stated briefly. The residential injury would have been considerable; but a greater one was the existence of the Glenridding lead workings, at the head of the lake, which would have given rise to some rather inconvenient popular prejudice. Thirlmere was therefore adopted, and the scheme is now about to be carried out.

The first part of the work towards Manchester will be a tunnel of nearly three miles in length, and 270 ft. below the surface. The aqueduct to be constructed will be large enough to convey 50,000,000 gallons per day. It was found that Thirlmere, with the addition of Mill Gill and Shoulthwaite Beck, would yield this quantity. It is intended to take advantage of the higher level of Thirlmere, and distribute the fall equally over the whole line of aqueduct to Manchester. This greater fall per mile will lessen the cost of the works upon the original proposal some 200,000*l.*, as it was then intended to construct the aqueduct at a sufficiently low level to allow Ulleswater to afford at some future time a further supply; but in consequence of the adoption of the above proposal this suggestion has been abandoned as being unnecssary.

There will be no conspicuous indication of the point at which the water is drawn from the lake, further than a cottage; none, at least, which an ordinary pedestrian would recognise. This assurance will no doubt gratify the popular mind, which is too apt to associate the name "waterworks" with a factory-looking pumping station having a high chimney, the sight of which is, to the lover of nature, one more indication of the vulgarising tendency of the present age. On leaving the tunnel, the aqueduct will issue in the valley leading to Grasmere, keeping the high land above Rydal and Windermere, passing under Chapel-green, Nab-Scar, and Skelgill Wood, being cut out of the solid ground where not tunnelled. In this latter case, after two or three years, it will be hard to discover where the ground has been disturbed. Crossing Troutbeck by a system of inverted iron syphon pipes, covered over with earth, it will be taken behind the residences of Hole Hird, St. Catherine's, and Elleray, by a tunnel, passing Windermere railway station, about two miles to the east. The valleys of the Kent, the Lune, the Ribble, and others, will be crossed by inverted syphon pipes, the rivers being passed over by bridges. When it reaches the neighbourhood of Bolton, the water will be conveyed in cast-iron pipes, mainly along public roads, to the existing service reservoirs of the Manchester Corporation, and then distributed to the inhabitants. There will be nearly thirty-three miles of 40 in. cast-iron syphon pipes, nine miles of 36-in. piping, and, besides these, about eighteen miles of 33-in. size. Before leaving this point, we ought to call attention for a moment to the important amendment upon the Bill, which was carried in the House of Commons, providing that upon certain conditions, all places in the neighbourhood of the aqueduct, requiring water, are to be supplied.

At Thirlmere the rainfall is fifty per cent. greater than at Ulleswater or Windermere. The corporation have purchased nearly all the land forming the drainage area of the lake, along with the manorial rights, so that no mineral workings can be carried on by private parties within that area. The lake is divided into two, an upper and a lower, the latter of which is not known to the ordinary tourist. The narrow stream connecting them passes through a rocky ravine, which is lined with dense masses of woodland. There is no road to the point where this stream leaves the upper lake. It is difficult of access. This spot has been selected for the erection of an embankment which will raise the surface of the lake 50 ft. 9½ in. The sheet of water is narrow now, but it will be wide and magnificent then. The present surface area of the lake is 328¼ acres; when raised, it will be 793 acres. In the event of no rain falling for 157 days, the lake would only, at the end of that time, be brought down to its present level, supposing that the whole 50,000,000 gallons per day were being constantly drawn away. The beauty of the lake will be increased beyond conception by this enlargement of its area. As the ground there consists for the most part of gravel and detritus from the hills, a fresh beach will be formed of unrivalled beauty. The drainage area of Mill Gill and Shoulthwaite Beck taken together is nearly equal to half that of the lake itself, which is 7,400 acres, the total available area for drainage purposes being 10,920 acres, or about 17 square miles. At 80 in. of rain, collected in a dry year, the yield, subtracting compensation, would be upwards of 49,000,000 gallons per day.

The Corporation of Manchester has been generous in its consideration of the interest of the tourist. The hilly road on the western side of the lake is at present quite inaccessible to carriages, and is rarely even travelled by pedestrians. It is intended to substitute a good carriage-road, following the sinuosities of the hills, which will communicate with the existing roads at each end. This will afford the tourist an opportunity of seeing the more beautiful Lower Lake for almost the first time. A drive will be formed all round the lake, which, when completed, will no doubt become a new, and not the least interesting, feature of a stay at Keswick. Nearly nine miles of roadway will thus be formed, costing something like 39,000*l.* When the works are carried out in their entirety they will have cost the Manchester Corporation a sum, it is estimated, of not less than three and a half millions sterling.

THE STRENGTH OF MATERIALS.

THE conception of an architect's qualifications, as formed by Vitruvius, differs widely from that which has generally been held in this country up to a very recent period. Probably the sketch drawn by the old Roman writer in the first chapter of his first book on Architecture was a fancy one, and no one could have been found at that time to come up to the ideal character, for the ideal was a high one. But it showed a much truer conception of the acquirements which an architect ought to possess than is often formed in the nineteenth century. It is true that in the last few years it has begun to be felt by some of those who have the interests of the profession most at heart, that it is desirable for an architect to have a fair general education to start with; and that, if this is supplemented by a certain amount of technical instruction in matters intimately associated with his practical work, he will be all the better for it. But when efforts are made to bring the means of attaining this technical education within the reach of all students, the practical difficulties are enormous. The Architectural Association has done excellent work in this direction, and will probably do much more, and the Institute will, we hope, take firmly in hand the question of architectural education, and endeavour to overcome the passive opposition which appears to exist in many quarters to the efforts which are being made to take away the reproach which undoubtedly clings to this country in this matter. It cannot be too often insisted upon that though an architect ought to be a draughtsman, a draughtsman is not necessarily an architect, and that the scientific side of our profession ought not to be neglected. It is inevitable that without a good scientific knowledge of construction, there must be a large amount of mere guesswork in working out the simplest design. The responsibility for this state of things does not lie with the students and assistants, who are like sheep without a shepherd. How shall they learn except they be taught? And we earnestly hope that before long a comprehensive scheme of architectural education will be founded on a firm basis by the combined efforts of the Institute and the Association.

We have been led to these remarks by the publication in America of a new work on the strength and stability of structures.*

This is a subject that has been too long supposed to belong exclusively to engineers, but it really concerns the architect most intimately. There are several treatises on the subject in existence, the principal one being that of Rankine, while Moseley, Box, Tarn, and lately Cotterill, have all published works of more or less importance. The great difficulty in the way of these works being of practical use to architectural students is that they are too mathematical, and the greater part of the reasoning would be unintelligible to the greater number of architects.† We think it a matter for regret that this should be the case, as we believe that many would-be students are deterred from studying the scientific principles of construction by the feeling that they will soon be stranded among the hopeless difficulties of the higher mathematics. The fundamental conceptions which form the basis of all inquiries into strength and stability should, however, without any doubt, be familiar to all students, and we should heartily welcome any text-book which should attempt to treat the subject in a manner more likely to be "understanded of the people," and on the assumption of less mathematical knowledge on the part of the readers. Although the work under notice does not proceed on these lines, it is a very important contribution to the literature of Applied Mechanics. Every one knows the great difficulty of enunciating clear and accurate definitions, and the author has endeavoured to improve upon the previous definitions of *force*,—upon a clear conception of which everything depends. We cannot think that he has been altogether successful in this attempt: *force*, according to Mr. Lanza, "is a tendency to change the relative motion of the two bodies between which that tendency exists," and although this definition differs very slightly from Rankine's, that force is "an action between two bodies either causing or tending to cause change in their relative rest or motion," we think the latter the clearer of the two. Velocity, mass, momentum, and other terms are clearly explained, and the propositions concerning the parallelogram, the triangle, and the polygon of forces, are clearly enunciated and proved, and the examples given for working out are all practical. The chapter on roof trusses seems to us excellent, and of the greatest importance to students, as not only is an explanation given of Clerk Maxwell's system of diagrams for the purpose of graphically delineating the stresses in the different parts of a truss, but a large number of stress diagrams for various forms of roof are given for the student to work out for himself. In this connexion a table of the rela-

* "Applied Mechanics." By Gaetano Lanza, Professor of Theoretical and Applied Mechanics, Massachusetts Institute of Technology. New York: John Wiley & Sons. London: Trübner.

† This objection does not apply to Professor Cotterill's work, which is the most admirably adapted to its purpose of any that we are acquainted with.

tive pressure of the wind on roofs of different inclinations is given. The maximum force of the wind is here taken at 40 lb. per square foot, but, as the author remarks, this is too small; and, in fact, the rule which we ourselves adopt, and which will be found to agree very closely with experiment, is the extremely simple one that the maximum pressure of the wind on any roof measured in pounds per square foot is represented by the inclination of the roof to the horizon: thus a roof of 20° inclination will have to sustain a pressure of 20 lb. per square foot, one of 45° a pressure of 45 lb., and so on. The necessity of concentrating the load on the joints of a truss in order to avoid cross strains is clearly explained.

The chapter on stresses and strains is very good and lucid, and the student's attention is directed to a fact which is too often lost sight of, viz., that the sudden application of a load produces double the strain which would be produced by the same load gradually applied. The German writer Wöhler* conducted numerous experiments in this direction, and he proved conclusively that the *variations* of load to which any material is subjected affect in a marked degree its ultimate strength. For instance, a certain quality of iron, of which the breaking weight was 45,000 lb. per square inch with a quiescent load, would be broken by a weight of 30,000 lb. per square inch applied at frequent intervals and entirely removed in the meanwhile. The importance of this fact in the case of roofs which are constantly subjected to various strains through wind pressure must be evident to every one, and yet, as far as we are aware, it has been entirely ignored.†

In dealing with the question of the stiffness and strength of beams, nearly all the recorded experiments have been made upon pieces of very small sectional area, and Mr. Lanza insists very strongly on the important fact that it is a pure assumption to conclude that large beams will behave in precisely the same way as small ones. Moreover, very few experiments have been made upon the combined effect of simultaneous tension and compression; and the ordinary assumption that a piece will be permanently injured if loaded beyond the "limit of elasticity" is not borne out by recent experiments. With a view to obtain reliable results, an extensive series of tests was carried on under Mr. Lanza's direction during the last three years at the Watertown Arsenal and at the Massachusetts Institute of Technology, and the tabulated results are given here and constitute the most important contribution on the subject that has yet appeared, and the results previously relied upon, which were deduced from experiments with pieces of small scantling, will have to be considerably modified. There can be no doubt at all that for compression Euler's formula, which has been constantly used in the ordinary text-books, is quite useless if applied to large and long timbers. This was shown to be the case thirteen years ago by the experiments of Mr. Kirkaldy, described in the Transactions of the Royal Institute of British Architects for 1872, and it is a very curious thing that these experiments should have been entirely lost sight of. It may have been thought that the experiments were too few to base conclusions upon, but the striking difference between the practical and the theoretical results should have prompted further investigation. These results very closely agree with those obtained by Mr. Lanza in his tests. To show the striking difference between the results obtained from the old rules and from those given by Mr. Lanza, we have calculated the breaking-weight of a pine post 5 ft. long and 4 in. square. According to Tredgold's rule this would be 36 tons, whereas Mr. Lanza makes it 14 tons. A precisely similar result was arrived at in testing the transverse strength of timber. Full-size beams of spruce, white pine, yellow pine, and oak were tested, and the tabulated results of no less than eighty-three of these tests are given, and whereas in the older text-books the modulus of rupture* arrived at from the tests of small pieces is given on the average as 6,300 lb. for spruce and white pine, 10,800 lb. for oak, and 8,298 lb. for yellow pine; the mean of Mr. Lanza's experiments gives 4,884 lb., 6,075 lb., and 7,292 lb. respectively. For instance, the breaking-weight on the centre of a beam of yellow pine 12 in. by 4 in. and 20 ft. long should be, according to the old formula, 13,248 lb.: it actually broke under a weight of 11,071 lb. It will easily be seen, therefore, that the value of these experiments can scarcely be overrated. A further series of tests were made to ascertain the effect of cutting into timbers for the purpose of framing, and in all cases it was proved that a considerable diminution of strength took place. The whole work is a valuable contribution to the subject of which it treats, and we can cordially recommend it,—especially that part of it dealing with the experimental tests,—to all interested in the subject.

* "Festigkeits Versuche mit Eisen und Stahl." Berlin, 1870.

† Attention has lately been drawn to this by one or two eminent engineers in relation to the effect of intermittent loads on railway viaducts.

* The modulus of rupture is defined as the greatest tension or compression per square inch to which the most strained fibre of a beam is subjected when the beam is just on the point of breaking, and from this the constant number is computed which is given in the text-books. The formula $W = C\frac{bd^2}{L}$ would be written as $W = \frac{2}{3}m\frac{bd^2}{l}$ where m is the modulus of rupture and l the length of the beam in inches.

NOTES.

FROM regard to the temporary failure of the proposal to purchase Parliament Hill as a permanent open space for London, Mr. Shaw-Lefevre has addressed an urgent and able appeal to the *Times* representing the value of the purchase to London, in a health point of view, even at a very large outlay. He observes:—

"The public is entitled to ask whether the Board have had an independent valuation made of the land, and whether they have made any offer, formal or informal, to Lord Mansfield; if their valuation results in a sum very much below 1,000*l.* per acre, the question would arise, if Lord Mansfield should not be prepared to treat upon such a basis, whether a Bill should be introduced to take the land under compulsory powers of purchase. Without committing myself in any way to an admission that 1,000*l.* per acre is a reasonable price, I must express the opinion that it should appear, upon a valuation by competent persons, that land thus situate, and in the near approach of London, is worth this sum, large as the amount would seem, it would be well worth while to the metropolis to acquire it. The views from it over London are splendid. Its purchase is equally necessary in order to prevent the practical ruin of Hampstead Heath, which owes much of its charm as an open space to the fact that this adjoining land is unbuilt on."

Whilst entirely sympathising with these views, we cannot but contrast Mr. Shaw-Lefevre's liberal tendencies in regard to this kind of expenditure with his cheeseparing policy in regard to the site of the War and Admiralty Offices. But the English politician is "made so" that he can see the advisability of spending money on purchases for material interests, but when it comes to a question of architectural splendour and dignity, of making a great building worthy of a great nation (if we are still to be allowed to be one), then we get nothing but the *non possumus* of buttoned-up pockets.

WE regret to hear that the reported reduction in railway rates, alluded to in our last issue, turns out to be very limited in its effect. A general misunderstanding appears to have prevailed with regard to the scope of the promised concessions, which will really only apply to coke (and possibly pig iron) from certain districts, and not be of general application. This discovery has caused much disappointment, amounting, as a Birmingham correspondent to a contemporary remarks, almost to dismay. We have before pointed out that such relief would be a great boon to the trade of the Midlands, and the supposed realisation of hopes long entertained gave such great satisfaction that it may well be imagined that the disappointment has caused a corresponding depression. Even the concessions still looked upon as likely to be made are not confirmed by the railway companies, some of which, in fact, are giving their customers notice that they are not making any alterations. It is greatly to be hoped that a similar disappointment does not await the Manchester and Liverpool traders, who are confidently looking for substantial reductions in the rates between those towns in consequence of the success of the Ship Canal Act. There is but little doubt, however, that they will benefit in this direction, and it is stated that the London and North-Western and Lancashire and Yorkshire Railway Companies have already resolved to adopt a revised list of rates which will effect a saving to traders of nearly ten per cent. in freight. In view of these concessions it is not surprising that other canal schemes are being pushed,—notably the one to connect Birmingham, Wolverhampton, &c., with the Bristol Channel ports, by joining, widening, and deepening existing canals. It is stated that freights would thus be reduced by no less than one-half, and this mode of conveyance would doubtless be utilised very extensively for heavy traffic for which immediate delivery is not essential. The North Eastern Railway Company, in reducing the carriage on certain minerals in proportion to the fall in the price of pig-iron, are showing a consideration for the depression from which their customers are suffering, which, if imitated by other lines, might perhaps avert the competition with which they are now threatened.

WE have received a circular from the Secretary of the Hartley Institute at Southampton in regard to the satisfactory result of a recent memorial to the Government on the subject of the Geological Survey of Hampshire and the Isle of Wight. On learning that it was not proposed to prepare a six-inch geological map of the county, but merely to survey the drift on the one-inch map, without revising the old one-inch survey of the solid geology, a memorial was prepared by the Town Council of Southampton, and circulated in the county for signature. This memorial was very numerously and influentially signed during last winter, and in February last was forwarded to the Lord President and the Vice-President of Her Majesty's Privy Council. The result has been that it is now determined that a six-inch geological map of Hampshire and the Isle of Wight will be prepared by the Geological Survey, by placing the colours to show the various formations on the present six-inch Ordnance map, and that in surveying the drift beds the solid geology will be revised up to date on the six-inch maps. This is a very satisfactory result of a well-timed interference, due mainly in the first instance to the representations made to the Town Council by the Hartley Institute.

THE Benchers of the Inner Temple have for once shown a little well-directed energy. They have during the past Long Vacation established a system of electric lighting for the Library of the Society. In place of the oil lamps and candles which used to make the darkness visible, the entire library is now equally, steadily, and comfortably lighted by numerous electric lamps. Should this experiment,—for such, to a certain extent, it is,—prove, as seems in every way probable, a success, it may fairly be expected to give an impetus to electric lighting in similar buildings. The chief clubs of London, the Athenæum, the Reform, and others, will, in such case, be behind the time if they do not establish it. The space for an engine-house may perhaps cause a difficulty in some cases, but it is hardly ever insuperable. The experiment at the Inner Temple may, therefore, prove a noticeable fact in the history of electric lighting.

THE question has been raised how far a Local Board can fairly go in asking a contractor of public works to draw his labour from the parish in which these works are being constructed, and to the cost of which the household labourers in that parish contribute as ratepayers. The Acton Local Board is at present proceeding with the construction of its drainage system, and a deputation of labourers of the parish waited on the Board recently,

and made a somewhat peculiar request. It seems that considerable feeling has been created among the unemployed labourers in the parish, of whom there are, as in most parishes, unfortunately, too many, because the "ganger" or clerk of works has sent the Acton labourers to the "right about" when they came to ask for a job on these drainage works. It is obvious that a contractor is free to draw his labour from the best and cheapest field, and that he would be acting prejudicially to his own interest, if not to that of his employers, if he did not do this, unless, indeed, it be specified in the contract that he has to draw his labour principally, if not entirely, from a certain parish. It is also obvious that such a limitation of the sources of labour would mean inferior labour, because the chance of selection is naturally diminished, and inferior labour means increased cost to the contractor. Therefore, if Local Boards are anxious to give employment to the labourers of their parish on public works which they desire a contractor to carry out, this must be, in fairness, stated in the tender, so that the contractor may give the circumstance due weight in his calculations. In the Acton contract there was no stipulation of the kind indicated, and the Acton Board acted wisely in merely respectfully drawing the attention of the contractor to the claim of preference which, in the matter of employment on these parish works, the Acton labourers who are competent to the work had over those from a distance. The matter has, it is believed, been amicably settled between the Board and the contractors, so that those labourers of that parish who are found able for the work required of them have no reason now to complain.

THE collection of water-colour drawings by Mr. Carl Haag, which has been opened at the Goupil Galleries in Bond-street, forms a remarkable example of that form of art which represents the most brilliant ability without ever rising to the height of genius. As instances of the highest power in handling the materials of water-colour painting it would be difficult to find anything superior to the best of these, both among the studies of Eastern figures which have become so familiar to all *habitués* of our picture galleries, and among the architectural subjects which are equally able in their way. In this sense the collection is a remarkable one for the amount and the quality of the work done, which never seems to fall below the high standard of execution which the artist has acquired. But there is nothing beyond this; nothing that appeals to the imagination. The large and splendidly-finished figure entitled "One of our Ancestors," may be, as it is claimed to be, correct in all its archæological details of dress, and is, moreover, very powerfully drawn; but it impresses us with no sense of reality as the revival of a figure of a former age; it is a burly fair-haired man dressed out in the requisite "properties," and that is all. Among the views are some very carefully-executed representations of the Acropolis at Athens and its monuments, as well as many of the representations of Eastern architecture with which the artist has made us familiar.

ON Saturday, the 31st ult., there took place, at Paris, the annual public meeting of the Académie des Beaux Arts, under the presidency of M. W. Bouguereau, assisted by M. Chas. Garnier, and by M. Le Vicomte Henri Delaborde, the Permanent Secretary. The President paid a tribute of regret to the memory of the Academicians deceased during the year,—M. Ballu, M. Du Sommerard, and M. Émile Perrin. He then announced the awards of the "grands prix" for painting, sculpture, architecture, and music respectively. Some interest was excited by the fact that the winners both of the first and second "grands prix" in architecture, M. André and M. Louvet, were both pupils of their fathers, of whom M. André *père* is a member of the Institut, and M. Louvet was one of the jury, the fathers of the two young men having been thus both their instructors and their judges. After the delivery of the awards, M. Delaborde read a notice on the life and works of Augustus Dumont, the last descendant of a numerous and ancient family of artists, and one of the prominent sculptors of his day in France, author of the figure of the "Genius of Liberty" which surmounts the "Colonne de Juillet." The musical portion of the proceedings comprised an overture by M. Hüe, a pensionnaire of the Académie de France at Rome, and a cantata for three personages (Diana, Endymion, and Pan), by M. Henri Leroux, pupil of M. Massenet.

THE Vicar of Deerhurst, Mr. Butterworth, communicates some interesting particulars to Thursday's *Times* in regard to the old Saxon building embedded in a farm-house at that place (near Tewkesbury), which is attracting many visitors. Mr. Butterworth says,—

"It is now a conclusion tolerably well established that the ancient edifice was formerly a chapel. It consists of two portions, nave and chancel, divided by a chancel-arch of very solid construction, the width between jamb and jamb being 6 ft. 6 in. The extreme exterior length of the chapel is 46 ft., the thickness of the walls being 2 ft. 6 in. There can be little doubt that this chapel, forming now the central portion of a large farm-house, was originally attached to a manor-house belonging to the Abbey of Westminster. The whole building is still called Abbot's Court. The chapel has all the appearance of being of pre-Norman date, and from the massiveness of its construction is calculated, if only it has a fair chance, to last for centuries still.

We are now in the possession of evidence which makes it probable that the exact age of the edifice may be told. Built into a portion of the farmhouse, an inscribed stone has been discovered, which was evidently the dedication slab of the altar of the chapel. Unfortunately, the stone has had its centre cut away and hopelessly destroyed; enough, however, remains of the inscription to prove its real nature and purport. It runs thus,—the letters still preserved are put by me in capitals:—

'. . . IN HONORĒ SANCTÆ TRINITATIS HOC ALTARE DEDICA TV E.'

Now, it was ordered by an early English canon,—viz., one of those set forth by Archbishop Wulfred at Cealchythe, A.D. 816, that all altars, at their erection, should have attached to them the name of the saint in whose honour they were consecrated. This injunction was obeyed at first, but after a time it became a dead letter; hence the rarity of the survival down to the present day of such inscriptions of dedication."

AT the Winter Exhibition at Mr. Wallis's Gallery in Pall Mall one wall is occupied by works of Professor Müller, most of which have appeared in this gallery before, but it is of interest to see so much fine work with so much individuality of style collected together for comparison. Müller might be called, perhaps, a "mannerist," but his manner is so powerful that it perhaps claims the higher standing of a "style." Among the works which are here are the "Arab School," "Mecca Pilgrims," "Egyptian Water-carriers," &c. We do not find the remainder of the Exhibition as interesting as the collections at this gallery usually are, but it contains, of course, some fine work. Heffner's "Reverie of Windsor" (16) is a large landscape, giving Windsor from the aspect of a foreign school of landscape painting; but Heffner is more at home upon his Bavarian plains. Among other works may be named Schloesser's "Food for the Mind and Food for the Body" (49); "The Event of the Day," by the late Everton Saintsbury, a village scene with a good deal of character; and "Le Forgeron" (11), by E. Allan-Schmidt, a small interior of a forge, admirably painted, and a perfect marvel in the artistic treatment of odds and ends of old iron.

MESSRS. Arthur Tooth & Sons' Gallery has become an interesting one among the minor exhibitions which have so much increased of late years. Visitors to the exhibition will be pleased to renew acquaintance with Mr. Alma Tadema's admirable series of small paintings, illustrating the four seasons by scenes from ancient Roman life, which will be remembered as having been in either the Grosvenor Gallery or the Royal Acamedy some time since; we do not like to say positively which, for memory becomes confused amid the long vista of picture-galleries in the vanished years. Among the attractions of the collection are two or three remarkable little studies of Venetian architecture by M. Gallegos, which, for brilliancy and truthfulness of effect and execution, it would be difficult to beat among paintings of this class. Leon Lhermitte's "Noon," a hay-field scene, painted in a grand and broad style, and an admirable work by Mr. Seymour Lucas, "Metal more attractive," are among other prominent paintings. The names of J. C. Hook, Brett, Leader, and Ernest Parton, are among the list of artists whose works are exhibited.

THE Council of the Société Centrale des Architectes commenced its session on Wednesday last, and a portion of the proceedings consisted of a report by M. Chas. Lucas on the studies of Mr. R. P. Pullan, which were presented to the Société Centrale when Mr. Pullan attended last June at the Congress of French Architects.

A SMALL collection of landscapes by various artists is to be seen at Messrs. Dowdeswell's, in Bond-street. The most interesting feature in it is a series of miniature Thames drawings, scenes at Pangbourne, Shiplake, Goring, &c., by Mr. F. W. Cartwright.

AT the Fine Art Society's Gallery are to be seen a collection of drawings by Mr. Herbert A. Olivier, illustrating life and landscape in India and Cashmere. These are not highly-finished or very effective drawings, but they impress one with the idea of being truthful, and taken straight from nature, and in this respect are of considerable interest.

THE Council of the University College of Wales at Aberystwith have taken a rather odd course in regard to their proposed new building. We commented not long since on the very unfair course which was at first contemplated towards Mr. Seddon, the original architect of the building, in proposing to give the completion of it to another architect. This was, we understand, overruled, and Mr. Seddon was appointed to complete his own work, when the existing portion of the College was burned, and now the whole question is re-opened, and the Council have decided on having a new building on a new site, but without having, apparently, obtained or decided on the site. Accordingly, they have issued instructions to competing architects for a building suited "to a sloping site," without naming the site. No building can be satisfactorily designed in this way, and we cannot help adding that we think the Council must have an inadequate idea of Mr. Seddon's very exceptional abilities if they expect to get anything better than he could give them by throwing him over a second time for this kind of blind competition for a building without a site.

FLOWERED AND OTHER QUARRIES.—II.*

IN the examples of quarries already given,—whether mere verbal descriptions of their ornaments and enrichments, or actual representations of the same,—care has been taken to refer mainly to such as have not already been described or represented.† The sixteen specimens already given, comprising single examples of many types, might no doubt be largely added to; for they have been mainly taken from particular localities, known specifically to the writer. It is often found that patterns of a certain quarry are common, or have been common, in a special county, neighbourhood, or diocese.‡ Other parts of the country might furnish fresh and remarkable examples, but those already given, added to those of a later period which illustrate this portion of the present paper, are fair and faithful specimens of English Flowered Quarries in general.

Other examples are now set forth in detail:—

Emmington, Oxon.—A vase of lilies,—the

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* See p. 597, *ante*.

† We may mention that the work on "Ornamental Glazing Quarries," by A. W. Franks, M.A., F.S.A., contains a collection of 112 plates of singular interest. It is a most useful and valuable publication, but exceedingly rare.

‡ There is good reason for believing that just as perambulating masons and builders travelled from place to place in the Middle Ages, so bell-founders and glass-stainers did the same, carrying on their work for awhile in particular localities.

vase yellow, outlined with black; the flowers white, the leaves pale-brown, shaded with dark-brown. (See illustration, fig. V., No. 1.)

Warborough, Oxon.—Here remains a quarry on which is represented the Host in white, with I. H. S., in capital letters in its centre, surrounded by a yellow glory, with rude cross hatching in the background.* (See illustration, fig. V., No. 2.)

Stamford, Lincolnshire.—There were several quarries remaining here in 1840, upon which a chalice and Host were depicted. The chalice and glory round the Host were stained yellow, and the Host itself white. The shading was of dark-chocolate lines. Some of these quarries were preserved by a local collector, when the north chancel window in which they were found was re-glazed *circa* 1848, and the quarries in question removed as useless and worthless. There were also in 1862, and probably still are, several somewhat similar examples remaining in an old house in York, which had belonged to the Corpus Christi Guild of that city,† and others with the chalice and Host represented on them, at Nostell Priory, in the same county. (See illustration, fig. V., No. 3.)

ending in fleurs-de-lys, with rudely-drawn leaves between each arm. (See illustration, fig. VI., No. 1.)

Yaxley, Suffolk.—On a large quarry the capital letter **I** in dark brown, with a thin flowing floriated ornament in yellow, forming a cross round about the letter. In type this ornamentation is much like the decoration of illuminated MSS. of the latter part of the fifteenth century.

Waterbeach, Cambridgeshire.—A small branch of oak with acorns, three in a cluster at the top and one on each side below. This device is outlined in dark brown, the leaves and acorns being yellow, shaded with a still darker yellow.

Marsh Baldon, Oxon.—A white flower of four petals placed upon a cross in yellow, with the arms of the cross ending in fleurs-de-lys. It is roughly and rudely drawn, but full of good effect.

Fyfield, Berkshire.—A four-petalled flower in yellow, placed upon a floriated cross ending in a bold fleur-de-lys, with four other fleurs-de-lys depicted between each of the arms of the cross. This quarry differs slightly from that already described remaining in the same church.

panes is given in Dr. Lee's "History of Thame Church."*

Waterperry, Oxon.—A yellow device of a Renaissance type, outlined in brown, consisting of three floriated leaves above, with an archaic piece of fruit in an oval centre below.

West Stoke, Sussex.—A remarkable specimen remains here. It consists of three circles in yellow, one surmounting the other two, and forming a triangular arrangement, upon a perpendicular stem. The letters I H S in dark brown, stand, one in each circle, while the inscription, est amor me' is placed on a label below. A golden glory, in yellow, surrounds the Sacred Name.

Independently of those already described or referred to, there are conventional flowers worthy of examination and note, on quarries remaining at Thaxted, Essex; Doddiscombleigh, Devon; Brown's Hospital, Stamford; Milton, Cambridgeshire; Easington, Oxon; St. Cross, Winchester; Garsington and Stanton St. John's, Oxon; Sutton Courtenay, Berks; Hunsdon, Hertfordshire; Penmachno, Carnarvonshire; Wantage, Berks; Chearsley and Crendon, Bucks; King's College, Cambridge;

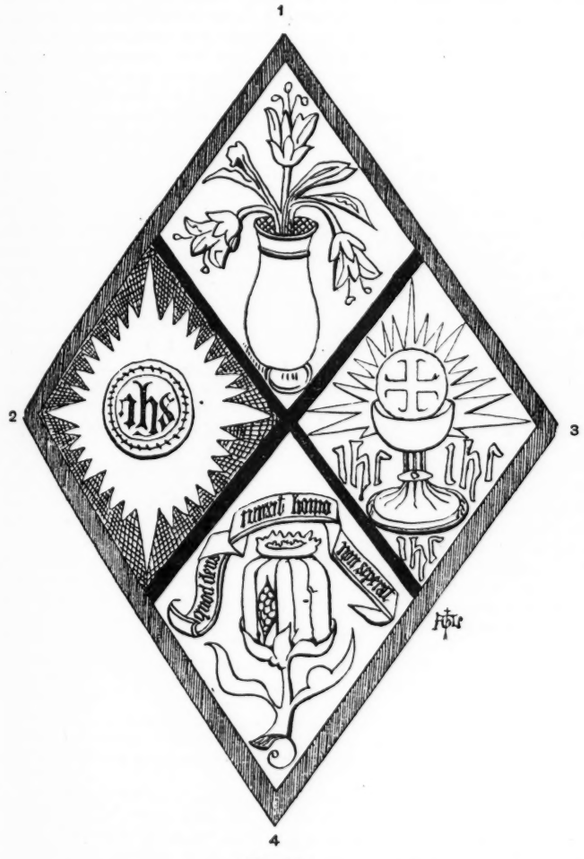


Fig. V.

1. Emmington, Oxon.
2. Warborough, Oxon.
3. Nostell Priory, Yorkshire.
4. Brandestone, Suffolk.

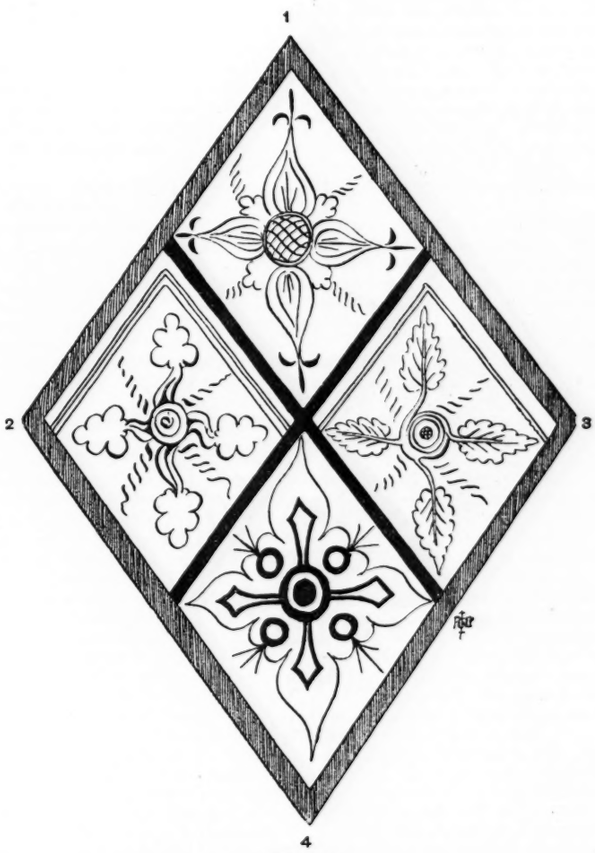


Fig. VI.

1. Berkhampstead, Herts.
2. Haddenham, Bucks.
3. Ockham, Surrey.
4. Stoke Talmache, Oxon.

Wilcote Chapel, Northleigh Church, Oxon.—A floriated cross of a simple character, the arms terminated by rude fleurs-de-lys, the centre a quatrefoil, with four branches of seeds, between each arm, coloured yellow and brown. Sketched in 1876.

Stanton Harcourt, Oxon.—A floriated cross formed of four small branches, not unlike the mare's tail. Coloured yellow and brown. Sketched in 1876.

Handborough, Oxon.—A cross formed of four plain-edged ivy leaves, with a bunch of berries. The centre is circular and cross-hatched, the leaves brown, and the berries black.

Berkhampstead, Herts.—A floriated cross, with circle in centre, cross-hatched, its arms

North Moreton, Berks.—A simple cross composed of four leaves conjoined cross-wise, stained yellow and outlined in black. Around the whole quarry is a double border, half of which is yellow and the other half formed of double dark lines. . . . . A somewhat similar cross of leaves, only more carefully drawn, and with a broad border of yellow outlined in black on one side only.

Baulking, Berks.—An eight-petalled flower in yellow, with a cruciform centre in dark brown, and having eight brown leaves surrounding it.

Wantage, Berkshire.—A "ragged robin," as it is commonly termed, drawn conventionally, with a flower or blossom at the top and two seed-pods with leaves on each side, the stem and leaves stained yellow, the flowers and seed-pods white, all outlined in brown, exceedingly graceful and effective.

Tettesworth, Oxon.—A similar flower was represented, almost exactly in the same form, only somewhat larger and bolder, upon certain panes in the old church here, pulled down *circa* 1843, and in similar colours. But when this building was destroyed these were, apparently, lost. An engraving of one of these picturesque

Headington, Marston, and Thame Park House, Oxon; and at Munsley, Herefordshire.

Mottoes, to note another feature of certain quarries, are often found set forth. Sometimes the same are of a distinctly religious character, *e.g.*, Jesus Mercy, at Penshurst, Kent; Miserere, at Lambourne, Berks; Memento, at Checkendon, Oxon; Marie helpe, at the small disused and deserted church of Easington, in the same county; De Profundis, at Charlcombe, near Bath. At Watlington, Oxon, a quarry remains with the name Seneca thereon, in black letter. Possibly other names of distinguished heathen and Christian writers were thus sometimes commemorated. In other cases quarries of heraldic character, set up in the windows of chantry chapels belonging to particular families, are commonly found placed alternately with crests, official or family badges, or coats of arms.† Of such, numerous examples exist

* On the chancel wall of the parish church of SS. Peter and Paul, Warminghall, Bucks, restored soon after the year 1846 under Mr. Joseph Clarke. A similar series of fresco paintings,—Hosts in glory,—were discovered at its restoration. The decayed state of the plaster rendered their preservation impossible. They were almost exactly identical with those in the quarries at Warborough.

† Information afforded by the late Mr. J. Forth Munby, of York, attorney-at-law. He does not make it clear, however, whether the guild in question was called "Corpus Christi," or whether one of its chief meeting-days was the festival in question.

* See "History of the Prebendal Church of the B.V.M. of Thame," &c., p. 203. London: 1883.

† *E.g.* At Horton Kirby, Kent, charged with the crest and initials of John Browne; and at Lullingstone, in the same county, where a rebus on a quarry still remains,—that of John Peachy; at Broughton Castle, Oxon, at Buckland, in Berkshire; and elsewhere.

in out-of-the-way manor-houses, now often deserted by the representatives of old families, and often let as farmhouses. Many such specimens have been wisely described and well depicted in the publications of local archæological societies.

At a cottage at Chenies, in Buckinghamshire, there remains on a quarry the head of a white greyhound, collared, springing out of a posy of forget-me-nots,—one of the old devices or badges of the ancient family of Cheney, of Buckinghamshire, which in Henry VIII.'s days had lived there "from time immemorial." (See illustrations, fig. VII., No. 1.)

The writer possesses a drawing of a curious quarry, the object represented upon which may be thus described:—A butterfly settled on a mushroom, which is growing out of a plot of grass, from which springs on each side of the mushroom's stem a forget-me-not in flower. The butterfly is tinted yellow, the mushroom white, the flowers and leaves are in dark brown. We have no note of the place in which this quarry remains, though we believe it exists in some church in Oxfordshire. There is possibly much hidden symbolism in the device, of many years.* The margins of late illuminated service books often contain them,—sometimes exceedingly spirited representations. They are also still to be found on the misereres of stalls, and are sometimes depicted in stained glass.† There is in the writer's possession a sixteenth-century quarry, possibly unique; at all events, very curious, which came from Westlington House, Bucks, and a woodcut of which has already been published.‡ It represents a fox or wolf, in a friar's habit, hooded, standing in a wooden pulpit with its face to the left, and holding a scroll in its right paw. Scratched on the glass on either side, in the style of writing of the latter part of the sixteenth-century, are the words "The People's Chaplain."

The white daisy or "marguerite" is found upon quarries at Doncaster, Yorkshire; Penn, Bucks; § Coberley, Gloucestershire; Culham, Oxfordshire; Coton, Cambridgeshire; and Yaxley, near Peterborough. It was, possibly, put up as the device of one of the Queen Margaret, out of compliment and honour to the spouse of the railway monarch.

The sun in its splendour,—one of the badges of Richard III. (see illustration, fig. VII., No. 3), which, it may be added, we know no second example.

The emblem of St. Peter,—the crossed keys in yellow, with two palm branches in saltire, still remain,—with other good examples, in windows of the Parish Church of Watlington, Oxon. At Adwell adjoining,—before the old church was removed and a new one built under Mr. Blomfield's directions,—there were two chancel windows almost filled with similar quarries. Recent inquiry leads to the conclusion that one and all have been destroyed.

There is a late but effective quarry at Waterbeach, in Cambridgeshire, containing the capital letters J. M.,—possibly standing for John Salisbury, sometime Bishop of Thetford, and subsequently Bishop of Man,—with a pastoral staff between the letters, the whole linked together by a tasselled knot. The letters and staff are in yellow, the cord white.

In the early part of Henry VIII.'s reign certain satirical illustrations of the clergy,—possibly of regulars by seculars and *vice versâ* of seculars by regulars,—were made in carvings both of wood and stone, and are still to be seen. Such, in one form or another, had been used for

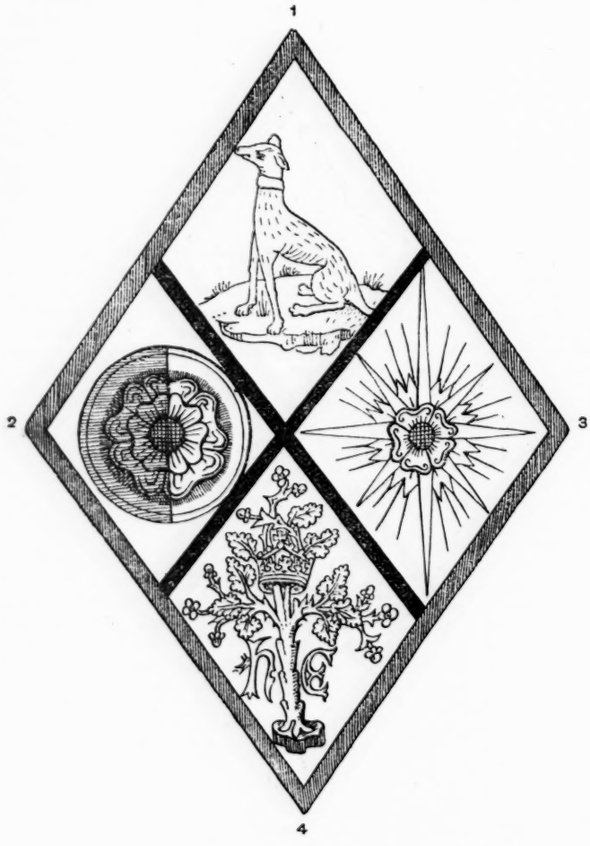


Fig. VII.

1. In a Private Collection.
2. Wooburn Deyncourt, Berks.
3. In a Private Collection.
4. In a Cottage at Haselmere, Surrey.

—is likewise frequently found upon quarries;‖ but the unique and remarkable device of a falcon with a woman's head holding a rose in its claw,—another badge of that monarch,—is exceedingly rare. Two fragments of such a quarry were found, when a grave was being dug in the churchyard of Thame Church, Oxon. This badge is found in sculpture in the Somerset Chapel at Windsor.

The two badges of Henry VII.,—a hawthorn bush crowned royally, and a white greyhound courant,—are each found depicted on quarries. The former in the Chapel of King's College, Cambridge (a picturesque and well-drawn badge); as also under a more elaborate form in Charrington Church, Surrey, and in a cottage at Haselmere, in the same county. (See illustration, fig. VII., No. 4.) These two last-mentioned examples are almost alike, and each has the letters H and E on either side. In the Rectory of Newdigate, in Surrey, there is a quarry remaining to commemorate a parson named Bell. A church bell is thereon represented in the centre, with the letters A and B on either side, with interlacing cords, their ends tasselled, the colours used being yellow and brown. (See illustration, fig. VIII., No. 2.) A fine specimen of a somewhat similar quarry remains at Little Greenford, Middlesex. It represents a hunter's horn, with its strap and ornaments, with flowers both at its apex and base, and with the letters H and B on either side. The horn and blossoms are white; the letters, stems, and leaves being of pale-yellow, shaded with dark-brown. The white greyhound may be seen on quarries at Ickford, Bucks, and at Stanton-St.-John's, in Oxfordshire. The writer has an original quarry from Westlington House, near Aylesbury, of a white greyhound seated and collared, no doubt another form of this Tudor badge. (See illustration, fig. VII., No. 1).

Specimens of the conventional rose, both white and red,* are frequently found of a date towards the end of the fifteenth and the beginning of the sixteenth century. There is a plain and bold specimen at Yaxley, in Suffolk, another at Hunsdon, in Hertfordshire, while other examples may be seen in the northern windows of King's College Chapel, Cambridge; and in a cottage near the Moors, Thame, Oxon, there remains on a quarry a fine example of a white rose placed within a circle.

The "Rose in the Sun," found depicted on quarries at Yaxley, Suffolk (an artistic specimen), Henley-on-Thames, Toot Baldon, Oxfordshire; Kenton, Suffolk; Wooburn Deyncourt, Bucks;—was the badge of King Edward IV. But examples of this are not very common.

The Pomegranate, the badge of Queen Kathe-

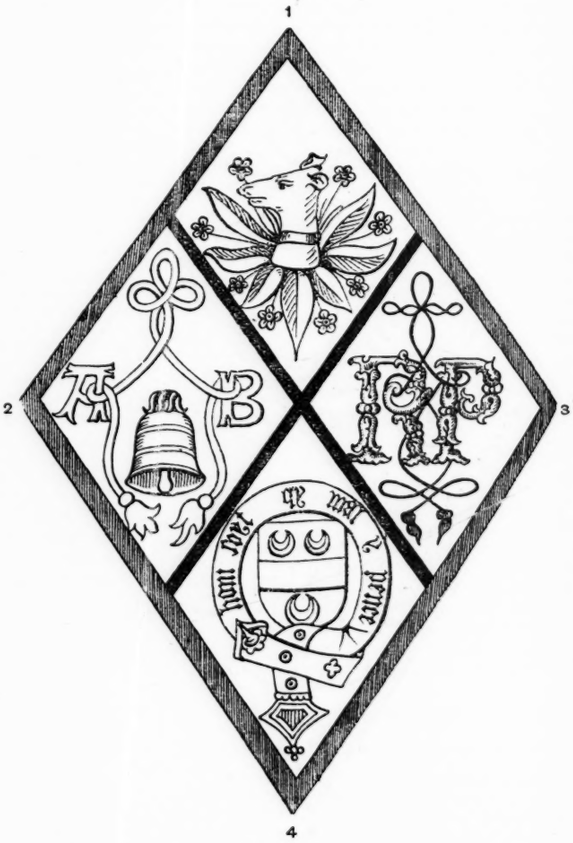


Fig. VIII.

1. Chenies, Bucks.
2. Newdigate Rectory, Surrey.
3. In a Private Collection.
4. Dytchley House, Oxon.

* "Rudiments d'Archéologie," p. 307. Paris: 1851.

† "Mélanges d'Archéologie," vol. i., p. 124, plate xxiv.

‡ "The Sacristy" ("Christian Symbolical Zoology"), vol. i., p. 190. London: 1871.

§ On inquiry we find that this quarry has been either lost or destroyed.

‖ It was from the example here exactly represented that the late Mr. Augustus Welby Pugin made a drawing for the new quarries used in the House of Lords. We believe that the quarry in question originally came from Rycott House in Oxfordshire.

* A quarry with a rose half red and half white, divided, as the heralds say, "per pale," existed in 1838, in the Parish Church of Wooburn Deyncourt, Bucks. (See illustration, fig. VII, No. 3.) This, with other fragments of stained glass, was cleared out at its recent "restoration." A Leicestershire friend informs us that a conventional rose quarterly white and red, remained on a quarry in the church of St. Margaret, Leicester, under the incumbency of the Rev. W. H. Anderdon, *i.e.*, *circa* 1850.—See also MS. 16, F. 2, Royal Lib., British Museum.

rine, wife of Henry VIII., remains on a quarry in the Church of Brandestone, Suffolk. This fruit is of yellow. Above, on a label, runs in Latin, Quod deus junxit homo non seperat. (See illustration, fig. V., No. 4).

The Castle and crowned phœnix, the badge of Jane Seymour, one of Henry VIII.'s wives, was originally represented in a window at Wolf Hall, near Great Bedwyn, Wiltshire, and remained in several lights of the same until the year 1846. These examples are not now to be discovered.

The portcullis crowned may be seen on a quarry at North Cray, Kent, placed upon an heraldic shield, upheld by a hand issuing from archaic clouds. A like emblem also exists at Exeter Cathedral and at Kenton Church in Devonshire. We have seen a quarry with the same device of a portcullis *un*crowned, coloured yellow, which came from Westlington House, Bucks, the residence of the family of Francklin. This may possibly have been brought from Chearsley Church, in which John Francklin and his wife in the fifteenth century founded a chantry,—suppressed under Henry VIII.,—and where a brass still remains over their original place of burial in the chancel of that church.

The badge of Queen Mary Tudor, a red rose upon a white rose, with a sheaf of arrows tied, the whole represented in a circle and crowned with a royal coronet, with rays of glory round the entire device, is represented in one of Browne Willis's collected sketches as remaining in his day upon a diamond pane at Ashridge Chapel, near Tring. Subsequent inquiry, *i.e.*, in 1883, from a member of the noble family of Brownlow interested in ecclesiology, leads us to conclude that this curious badge,—probably unique as represented on a quarry,—has been lost or destroyed. The chapel has been restored since the time of Browne Willis, and much that was ancient and curious has been lost.

In the writer's possession is a quarry of no bad type but of the Renaissance style, with the letters R. P.,—for Richard Parkhurst,—from Westlington House, Bucks (see illustration, fig. V., No. 3); and also a rebus on glass of the person in question, representing a deer-park enclosed by palings, with the word HVRST below. Both are obviously of the sixteenth century.

Some interesting specimens of heraldic quarries,—one, the merchant's mark of the family of Dormer, of Bucks and Oxon; another containing the armorial bearings of John Dormer, granted *circa* 1517; and a third, the old crest of the same family, a bird on a gloved hand,—remained in an old cottage at Dadbrook, near Cuddington, Bucks, *circa* 1870. Upon inquiry, in 1884, of the owner of the place, I found that the glass had been removed to Dadbrook House, and that in its removal it had been broken. The fragments are, however, still preserved.

There is a merchant's mark on glass in St. Michael's Church, Oxford, on each side of which a white rose (barbed and seeded or) is represented.

A somewhat similar mark occurred in several quarries in the north aisle of Thame Church, Oxon. This mark belonged to Geoffrey Dormer, sometime woolstapler and merchant of the Staple of Calais, who died in 1503. But these were removed or lost *circa* 1843, though the same mark still remains engraved on a brass shield upon his tomb.

There were, in their original position, some exceedingly effective heraldic quarries at Lee's Rest, part of an old mansion near Charlbury, Oxfordshire. They consisted of (1) a coat of arms, (2) a crest, (3) the letters H. L., and (4) another coat of arms, each being surrounded with the garter and its motto. All had been evidently put up soon after the year 1597, when Sir Henry Lee, the owner of the then existing mansion, was sworn of the Privy Council of Elizabeth, and made a Knight of the Garter (see illustration, fig. VIII., No. 4). These quarries, for safety's sake, have been removed to Dytchley House,* by the Hon. Harold Dillon, F.S.A., where they are now preserved.

Free Library, Bethnal Green. — His Royal Highness the Prince of Wales has "gladly consented to become Patron of the Bethnal Green Free Library, in place of the late Lord Shaftesbury."

* One of the four, it appears, has been lost or broken. It is that upon which the arms, as depicted on the alabaster monument of Lady Lee and her children, in Aylesbury Church, were represented.

LETTER FROM PARIS.

Now that the election period has terminated, will the Government at length occupy itself about the industrial crisis, and will the new legislature be the signal for a trade revival? Public opinion, to say truth, shows itself very incredulous on this head. The political passions are far from being lulled, and one can see already that the new Chamber will have too many irritating subjects before it to decide at once on new works of public utility. If we add to this natural uneasiness the difficulties of the epoch on which we are entering, and the sufferings which winter and the dull misery of a population out of work will bring in their train, we can easily comprehend the general feeling of apprehension which exists. It is as a diversion from these kind of pre-occupations that the Parisian Municipality and the press wish to organise the *fêtes* of which M. Alphand is studying the programme. There are to be divers grand balls at the Hôtel de Ville, a tournament on the Champ de Mars, and an immense historical procession of the Mediæval trade guilds.

These are only palliations, while public opinion demands a number of important operations, without counting the Metropolitan railway, which is a pressing necessity, or the Exhibition of 1889, which seems to have gone out of people's minds for the moment. There is, for instance, the opening up of the Palais Royal, a project intimately connected with the extension of the Bank of France, and which will necessitate a whole series of street improvements of great importance.

By its actual situation the Palais Royal, placed close against the neighbouring houses and surrounded by narrow streets to which one descends by steps and alleys, has become a kind of *cul-de-sac*. Its galleries of splendid shops, formerly the resort of visitors and loungers, become more and more deserted, and the numerous tradesmen there feel so clearly that it is a question of actual existence to them that they have offered spontaneously to contribute to the cost of, or even to erect at their own entire cost, a great flight of steps, covered with a verandah, opposite to the Rue Vivienne, where the latter so suddenly and inconveniently terminates. The Town Council ought to occupy itself at once with this important improvement scheme, which will modify entirely the aspect of one of the most curious quarters of old Paris.

The Rue Vivienne itself is in process of transformation, thanks to the works for the isolation of the Bibliothèque Nationale. The large buildings intended for lecture-halls and collections are beginning to replace the private houses and shops which have been disestablished for the sake of public safety. These new constructions will probably be completed in 1886.

It is to be hoped that similar precautions will at last be taken in regard to the Museum of the Louvre. The grates and chimneys, it is true, have been replaced by heating apparatus installed in the basements, but that is all, and an Under Secretary of State, were it M. Turquet himself, may hardly be able to conquer the routine and indifference of the Government. It is not here the merchants who must be driven from the temple, according to Scriptural precedent, but that knot of minor officials and *employés* whom the State lodges in the Museum itself, by the side of the Raffaelles and Titians and Poussins, and whose presence constitutes a continual danger of fire to our national collection. But M. Turquet, to do him justice, is full of good intentions. Thus he is credited with the excellent intention of taking down very shortly the gigantic quadriga in plaster which M. Falguière erected some three years ago on the summit of the Arc d'Étoile. It is to M. Antonin Proust that we owe the unhappy idea of this useless crowning of Chalgrin's fine monument, which has been condemned by public opinion long since.

Among urgent and necessary operations is also the reconstruction of the Gobelins, which has been long ago talked of. The "Conseil Général de Bâtiments Civils" has already given its approval to the plan of M. Chabrol, the architect, and if Parliament will vote the three millions necessary a start can be made in 1886 with the above work, comprising buildings for administration, exhibition galleries, and schools of painting and decorative design. As the actual buildings, constructed on no fixed plan, and successively enlarged at different epochs as necessity arose, have been partly demolished for carrying through the Avenue des Gobelins, and partly destroyed by the incendiaries of the Commune, the work required will not bear delay if the reputation of our national manufacture and its collections is to be preserved. As we are on the *rive gauche*, let us not forget to name the work which has been undertaken to repair and consolidate the old tower of the ancient Abbaye des Génovéfains, which for five centuries has arisen on the Mont St. Geneviève, and overlooked the quarter of the "Escholiers Parisiens." Let us add, in passing, before quitting these remote quarters, where curiosity brings numerous visitors to the Panthéon, that it is very necessary to think of doing something with this chilly temple, which at present serves no public object; with its great dome, its bronze centres which hang in empty space, its partly-decorated walls and immense nave, it has an air of desolation which in the eyes of visitors produce a lamentable effect. There is another operation which for Paris would have the greatest interest, the enlargement of the Halles Centrales, constructed in 1858 by Baltard, and which are now notoriously inadequate. At that time Paris had only 1,500,000 inhabitants, while to-day it counts more than 3,000,000.

It is not far from the Halles, in the Rue Étienne Marcel, that there stands the old tower of the Ducs de Bourgogne, which constitutes one of the curiosities of Paris. An architect of ability, M. Huillard, has prepared a scheme of restoration, which it has been decided to carry out, for the "Commission de Monuments Historiques" has compelled the municipal government to take steps to secure this curious specimen of the military architecture of Henri IV. from further decay.*

Artistic news generally there is but little, the following may be taken as the summary. There is first the award of the Leclair prize, by the Académie des Beaux Arts, to two young architects, MM. Convert, pupil of M. Ginain, and Jay, pupil of M. Daumet. There is also the nomination of M. Delaplanche, the eminent sculptor, to the Superior Council of the Beaux Arts, in place of Schœnewerk, whose tragic death we have recorded. The sculptor Chapu is completing a remarkable monument to Mgr. Dupanloup for the town of Orleans. The same artist has been recently commissioned to execute the bust of the Empress of Russia.

In regard to artistic work to be carried out by the Municipality, there is talk of decorating the Place d'Anvers with bronze statues of Sedaine and of Diderot, and of raising in the same square an allegorical statue of Paris, for which M. Coutan has made a model. The statue of Lamartine, by M. Vasselot, the vicissitudes of which were recounted in our letter of September, will also be soon placed at Passy, not far from the châlet which the town offered to the illustrious poet. There will be raised at a little distance the statue to Victor Hugo, on the *place* of that name, near which he died.

There is talk, also, of decorating the state rooms of the Hôtel de Ville with medallion portraits of men illustrious in art, literature, and science. In one room will be placed the portrait of Ampère, the celebrated physicist; of the astronomer Arago, the physiologist Claude Bernard, and the chemist J. B. Dumas, who for so long a time was President, under the Empire, of the Municipal Council of Paris. In the "Salon des Lettres" will be placed the portraits of Victor Hugo, Lamartine, Littré, and Michelet; and in that of "Arts" those of Ingres, Rude, Herold, and that of the architect of the building, Theodore Ballu, whose bust in marble, the work of Ernest Barrias, will adorn the vestibule of the grand staircase.

There is also the exhibition of the works purchased this year by the State; but, as all these were mentioned in our articles on the *Salon* of this year, we may pass over this exhibition, which is not very favourable to the judgment of the Ministry of Fine Arts, and will not tend towards raising the level of contemporary art in the eyes of the public.

It remains still to speak of the exhibition "du travail," which will be open till the end of the month at the Palais d'Industrie. We wished before to speak of it, but other subjects have crowded it out. Besides which, this exhibition, proclaimed *urbi et orbi* with much sounding of trumpets, is mostly only an immense bazaar for the display of the vulgar "article de Paris,"

* From a quotation we gave from a French paper in our "Notes" last week it will have been seen that this restoration is viewed with great disfavour in some quarters.—Ed.

which is to say that it contains nothing truly artistic. We will pass, then, rapidly enough the hall where the department of primary education of Paris has made the mistake of exhibiting the work of pupils which ought not to have crossed the threshold of the elementary schools, and pause before the windows designed by M. Champigneulle. We find here some very curious specimens, already seen a year ago at the "Union Centrale des Arts Décoratifs," especially a "Fontaine d'Amour," a remarkable imitation of the window glass of the sixteenth century, intended for the mansion of Mdme. Judic. We like less the Henri VIII. window, also commissioned by the same lady.

The exhibition-room of M. Champigneulle is very interesting, for it is a sort of compendium of the art of stained glass. It shows us the art from the great epoch of the thirteenth and fourteenth centuries, when glass, roughly made and striated by the accidents of manufacture, formed in its lead seams a veritable mosaic of sparkling facettes, to the windows of the sixteenth and seventeenth centuries, painted on large surfaces, and which were the precursors of the glass blinds now in use in our private houses. We note among these latter, which take a more and more important place in the decoration of apartments, Indian and Japanese glass of glaring tones and real originality. But by the side of these modern examples, we much prefer the archæological reproductions, especially three large reproductions of the windows of Chartres and Bourges. There is especially a copy of a rose-window from Chartres, of perfect execution, and which might easily deceive the eye into thinking it original. We should mention also the great modern window of which the cartoon, executed by M. Wagrez, symbolises the return to France of Alsace and Lorraine. The design is very pure, the figures well arranged, and the colour harmonious and sober.

As a complement to this exhibition, M. Champigneulle has had the happy idea of uniting, in the gallery, a complete installation of the instruments and methods used in glass-working, so as to render intelligible to the public the industry of the glass-worker, from the oven where the vitrification takes place, to the successive operations of drawing, cutting, and leading.

We are again obliged to terminate our letter with an obituary notice. Without speaking of Emile Perrin, who, besides being successively director of the Opéra Comique, of the Opéra, and of the Théâtre Français, was a painter of talent, we have to record the death of the landscape-painter, Ségé, which leaves a great gap in the artistic world. He was a conscientious painter, of very individual talent, who, though a Parisian *pur sang*, delighted in reproducing the arid landscapes and wild moors of Brittany. He had studied with Flers and Leon Cogniet, and had obtained medals successively in the *Salons* of 1869, 1873, 1874, and 1878. Since 1874 he was a chevalier of the Legion of Honour. We may mention among his best pictures, "Le Chemin Vert," exhibited in 1878; "Les Châtaignes de Beauvoir" (*Salon* of 1882), and the "Vallée de Ploukermeur," purchased by the State in 1883.

In regard to M. Perrin, who has rendered such services to musical and dramatic art, he is replaced at the Comédie Française by M. Jules Claretie, an accomplished writer whose name is well known in England, as he was for some years the Paris correspondent of the *Athenæum*.

PRESIDENT'S ADDRESS, ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE following is the address delivered by Mr. Ewan Christian, President of the Institute, at the opening meeting of Session 1885-86:—

Gentlemen,—Last year at our opening meeting, when I had the privilege of addressing you, I had before me the comparatively easy task of speaking of the half-century in the life of our Institute then about to terminate. I have now to deal with the future, and who can be said to be sufficient for such things? But, before proceeding to speak of other matters, I think it is incumbent on me to fulfil a sorrowful duty,—that of recording the death of our chief founder and past president, Professor Donaldson.

Last year I could say, when reviewing the past, that we had still with us "the loved and honoured Nestor of our profession;" now, we must be thankful that he has gone to his well-earned rest, leaving us to chronicle and cherish the memory of his genial kindly presence, his never-failing enthusiasm for the art he loved so dearly, and the earnest self-sacrificing labour he was always ready to bestow on anything connected with the affairs of our corporate body. Truly, though in a different sense, and without profanation, it may, I think, be said of him, in the words of the terse and noble epitaph inscribed in the cathedral to the great architect of St. Paul's, "*Vixit annos nonaginta non sibi sed bono publico*," and, as regards this Institute, I think it may also be added, "*Si monumentum requiris, circumspice.*"

If we look back mentally to that meeting of fifty-one years ago in the parlour in Regent-street, and now on the large assembly gathered in this room, or wander into the well-stored library behind me, truly we may say his early work has borne good fruit; and though his conception, like that of the great architect, has needed many able men and willing coadjutors to bring forth this result; yet his was the mind that commenced it, and, as was well said by our first president, Earl de Grey, "There is no individual who has taken more pains to forward the object which all have in view than Mr. Donaldson has by his indefatigable exertions, or has contributed more heartfelt zeal to its benefit. Others have contributed in various ways, and most efficiently, but he has had the labouring oar. He has laboured steadily at that oar, and I trust and believe that he has rowed us into a good harbour."

Gentlemen, I shall not on this occasion attempt to portray the events of the life of our departed friend. That is a pleasing task I must leave to others. There have been many notices of his career, and Mr. Godwin, as you know, has given us a sketch of much interest,* which renders further comment from me the less needful. Our friend has left us, gathered to the great harvest like a sheaf of corn fully ripe, surrounded by all those things which should accompany old age, as "honour, love, obedience, troops of friends," bequeathing to us the fresh green memory and the bright example of the kind and courteous Christian gentleman, the enthusiastic lover of his art, and the honoured and honourable architect; and what more can I say, or what more would he have wished to be said of him than "Let me die the death of the righteous, and may my last end be like his"? The venerable Professor's death occurred at a time when many members were out of town: consequently, although 1,000 letters were despatched on the afternoon of the day on which the intelligence was received, few comparatively were able to obey the summons and be present at his burial, but those present were, I am sure, all earnest mourners of departed worth. On behalf of the Council I addressed to the family, shortly afterwards, a letter of condolence; but you will, doubtless, desire that one from the whole body of our members shall also be sent, and the Council will be ready to transmit any resolution that may be arrived at on this subject.

Before dismissing this matter wholly from our minds, let me say a few words further, not so much on the personal man, but on the character of his studies. It has been said that there will never be another Donaldson. Possibly, as regards intense zeal for the welfare of this Institute, we "ne'er may look upon his like again," though I hope the contrary; but, as regards the status and culture of the individual architect, surely it is to be hoped that such men as he will still be found in our ranks. Sad, indeed, would be the prospect if it were otherwise; but when we call to mind, as we may easily do, the numerous examples in our own time of the value of prolonged study, have we not good reason to hope that the future will not prove to be so barren as such a prophecy might lead us to expect, and that not only the genius, but the ability to wait, may still be found to meet this necessity of our art, if it is to be practised in its full development?

Other losses by death I shall refer to later on; that of our late Fellow, Mr. Whichcord, was sorrowfully recorded in January last; but it is, I think, the first time in our history, that two past-presidents have left us in the course of a single year.

As regards the future: you will probably remember that at our opening meeting of last year I alluded to the necessity of some change in our Charter to meet the requirements of this later time, and it is, I think, remarkable that the death of the Founder of the Institute should have coincided so nearly with the issuing in a completed form, of the proposed new Charter, which the committee appointed for the purpose of considering the subject has presented as the result of their labours. As a print of the document has been sent to each member of the Institute, and as a special meeting will shortly be called for its consideration in detail, it is hardly necessary for me to do more than glance at one or two of its principal provisions.

Few human works can be called perfect, and we cannot therefore expect to escape criticism; but as I hope no one amongst us, any more than the members of the Council, has any desire except that of obtaining for the future of our Institute the best government possible and the greatest freedom of action practicable within reasonable limits, I trust the subject will be carefully considered by all of us, and in the judicial spirit which alone is likely to conduce to the desired end.

We have been told that the result of the change will be to give greater power to the Council; but a government, to be worth anything at all, ought to be strong; and, with a greatly enlarged constituency, surely the ultimate decision of any important question must be that of the whole body of members, and, rightly given, ought to be generally satisfactory. We have been asked also why the by-laws, which are to determine so much important action, have not been issued with the Charter itself; but it is a golden rule of business to do one thing at a time, and the Council are of opinion that the principles of action should be first agreed upon, and the settlement of details may follow afterwards.

Probably the most important provision in the proposed new Charter is the extension of the examination test to all classes of members, except under circumstances and in cases in which the Council may determine otherwise. I think we must all see that that requirement is an inevitable consequence of the obligatory examination of Associates, and must ultimately extend to the strengthening of our body.

That there must nevertheless be exceptional cases is also inevitable, and it is, in my judgment, not undesirable that so it should be. There will, I trust, always be some exceptional men, deep students and real artists, to whom the ordinary rules of examination cannot apply; men of genius to whom solitude is the nurse, who may not see with our eyes, but whose presence amongst us would necessarily be welcomed; men who, having proved their power, could not be asked to submit to ordinary rules. There are such men now, and there may be more in the future, and it would be for our welfare to include them all amongst us.

As regards that important section of our body, the Associates, the extension of the power of voting is a right and necessary change, and it is to be hoped that by this, and the alteration in the method of recording their votes, which the new Charter will give the power by by-laws to prescribe, the provincial members may be put on that footing of equality which has so long been desired, and to which, under the provision of the old Charter, it was found impossible to attain. As to other matters, it is hardly necessary to occupy your time with further observations; but such radical changes as those to which I have alluded could not be passed over without remark.

But although the question of internal government is undoubtedly important, there is something beyond, and still higher, which it behoves us to consider.

The opinion I expressed last year on the subject of the education of the architect I have long held, and have not yet seen reason to change; but although I have not been able to discover how this Institute is to become an educating as well as an examining body, I see no reason why we should not do more than has hitherto been done for facilitating the attainment of knowledge by those who really desire to possess, and have not the means of otherwise acquiring it.

Architecture is essentially a science of observation. Its theory and history may be learned from books, and in office practice and other teaching, but unless these are supplemented by the careful study of buildings at home and abroad, education cannot be really said to be satisfactorily completed. Would it not then be within our province, as I trust it might also be found within our means, to do more than we

* See *Builder*, August 15, p. 212.

have hitherto done in establishing travelling scholarships as prizes for young men who have distinguished themselves in passing our examinations; supplementing, but also enlarging, the scope of what we already possess in the Soane and Pugin prizes, and the Godwin Bursary; scholarships, I mean, for the promotion of real and prolonged study in such paths of our diversified art as may be most congenial, and at the same time the best adapted for advancing that knowledge, which our Charter proclaims to be the great object of our existence.

Our ranks have to some extent, in the last few years, been recruited by men who have passed through the educational course of our universities; let us hope that in the future they may be still further leavened by such well-trained students; for nothing surely is of more importance than that the preliminary education of the architect should be as thorough and complete as it can possibly be made; nor can there, I think, be anything more valuable for raising the general level of professional attainment.

Nothing, of course, will atone for want of general aptitude and artistic feeling; but, in my judgment the additional time expended on the university course, provided it be well employed, is of more importance to the future of the architect,—supposing such genius or aptitude to exist,—than the same time spent in any other way. May we not hope that the advantages of this early education may be more fully exemplified amongst us?—and combining with this our English system, I do not fear the future of our art.

There is much, indeed, in what we see about us to make us mourn; but there are not wanting many hopeful signs and sources of rejoicing in good work now being done amongst us. Englishmen are apt to decry and depreciate the works of their own countrymen, and it is hard to obtain favour for contemporary work at any time, but there is much done unknown to the general public which proclaims the fact that architecture in this country is by no means that dead and spiritless thing that some would have us to believe. That we cannot revive the grand old times of originating genius, is a fact to be deplored, but neither can we change the character of our age, though we need not despair of inspiring it with fresh ardour in the search for the beautiful, and the execution of that which will live will be duly valued in the future.

And now, gentlemen, without dilating too much upon our own proceedings, I think I may say of the preceding session, that its record as given in the last volume of Transactions is one of considerable and varied interest. Mr. Stannus's paper on the internal treatment of cupolas, and the discussion which followed, showed very conclusively the great difficulty of the subject, and as regards the task of completing the work of the great master architect of our metropolitan cathedral, the almost hopelessness of arriving at a conclusion that shall be generally accepted as satisfactory. Certainly it is a subject worth any amount of preliminary study and cost that may be bestowed upon it, and whether the work be finished in our generation or the next, is comparatively a matter of minor importance. Our Associate, Mr. Lawrence Harvey, did good service in bringing before us the highly suggestive work of Professor Semper, refreshing us with thoughts from abroad, on a subject undoubtedly of very considerable importance to the progress of our art. Mr. Farrow's essay as the holder of the Godwin Bursary, was an excellent illustration of the great advantage to our younger members arising from the wise and thoughtful provision of its founder . . . . . As a combination of practical and artistic work in a subject of much freshness and general interest, the modest but very excellent paper on flint work, by Mr. Baggallay was an illustration of thorough good work, which I trust he will follow up hereafter; and last, though certainly not least, of general sessional papers, I need hardly call to your remembrance the learned and very excellent paper by our Fellow, Alexander Graham, on "Remains of the Roman Occupation of North Africa," a subject of great and abiding interest, on which we shall, I am sure, very gladly welcome any further contribution with which he may be willing to favour us. Mr. Graham's paper was, as you know, profusely illustrated by many beautiful drawings and sketches, and our annual volume is greatly enriched by these and others I have not particularly mentioned. Gentlemen, I think there is in this brief notice of papers much to encourage us.

In my former address I said, "Are there none of our younger brethren anxious to show what they can do, and would it not be good for them, and useful for us that they should take the opportunity offered by our meetings of testing their powers? And is it not a hopeful sign, and does it not fully justify our proposed action in respect of the Charter, that eight papers out of eleven, all more or less valuable, should have been contributed by Associates? Truly I think so, and I rejoice in the fact, and while I would congratulate our younger brethren on the fruits of their ardour; I would ask, ought it not to stimulate their elders, not to imitate, but, from their more extended knowleedge and mature experience, to put before us from time to time the fruits of such researches as Mr. Graham's?

To some of us, immersed as we are in the active pursuit of our laborious profession, we know that it is impossible; but I would fain hope there are still among us men of learning and some leisure,—Sharpes, or Donaldsons, or Grahams,—who may be stirred to activity by this wholesome rivalry of younger men.

The record of the work of the past session would be incomplete were I not to refer to its closing meeting, when we had the pleasure of welcoming the great explorer, Dr. Schliemann, and presenting to him the Royal Gold Medal, of which you had unanimously voted him to be a worthy recipient. I have reason to know that the satisfaction was mutual, and that not only in this room, but subsequently, Dr. Schliemann expressed the great delight that our reception had afforded him.

Nor must I allow the proposal of Professor Kerr to pass unnoticed. We all know how jealous our friend is of the honour of this Institute; and how anxious that its operations should be extended wherever it may be usefully done. We may not all agree with him in what he desires to accomplish, and I for one cannot concur in his proposal for the alliance with noble patrons, because I think, with all due respect, we have as a corporate body passed that stage of development, and shall do better to trust to ourselves; but, nevertheless, I highly appreciate his wish for general improvement in our action, and shall be always ready to support whatever well-considered measures may be practicable for advancing this result. Professor Kerr has, I believe, appointed his committee, and we may hope in due course to hear the result of their labour.

Amongst subjects that have interested not only architects, but society generally, is one that has excited much keen controversy, and on which you will doubtless expect me to say a few words,—Westminster Hall. Last November I said, in respect of the appointment of a Committee of the House of Commons to consider Mr. Pearson's plans and report, "I think in this case the action of Parliament is hardly to be regretted, if it gives further time for the consideration of a subject of unquestionable difficulty, one which deeply concerns all who care, as we should do, for the preservation of our ancient monuments"; and, as regards the thorough sifting of the case, I think good has been done by eliciting opinion from all sides, though, as regards the architect chiefly interested, it has been a somewhat fiery ordeal, which, however, he has happily survived. It is no part of my business to uphold the decision of the Committee, though in the main I think it was right; but I must confess to much astonishment at opinions that have been expressed on the one most important point of substantial repair. How it could have been seriously said that the great buttresses should have been left in their sadly dilapidated state to moulder away into ruin, while the hall itself was to be preserved, I am at a loss to understand. Westminster Hall is, and I hope will long remain, a living building; one of the noblest in the land; one of which no Englishman can be otherwise than proud; one that it is our bounden duty to maintain; and I think that the late First Commissioner of Works did wisely when he appointed our Fellow, Mr. Pearson, to carry out the work so urgently needed for its preservation.

We may not agree with every detail of what he proposes to do; but is it just, is it generous to criticise in the way that has been done the work which he, as a thoroughly scientific and practical architect, pronounces to be absolutely needed for the maintenance of this grand historical monument? Personally, I regret that Mr. Pearson's proposal for raising the towers is not to be carried out, but I cannot do otherwise than rejoice that the Hall is still to remain open to view. It is to be hoped that in the near future the lead may be restored to the roof, and the poor turret now standing may be replaced by a flèche more worthy of the grand and beautiful proportions of the finest piece of timber-framing of which this country is possessed.

Of similar works of restoration that have been in progress during the past year and the further work in prospect, those at the Tower of London are probably not the least interesting. Considering the national importance of that great building, and the special knowledge required for its proper treatment, it would be satisfactory to know that advice had been asked from those who, having long studied the subject, may be best qualified to afford it. This may have been done, and I trust it has, for it would be much to be regretted if work of this kind were not to be carried out with all the accuracy which only very few specialists can be expected to possess.

Another subject, interesting alike to ourselves and to the artistic and antiquarian world in general, about which controversy has raged so fiercely that the aid of an archbishop had to be sought in order to settle a question which might, one would have thought, have been safely left to the architect to solve, is the restoration of the tower of Peterborough Cathedral.

I should occupy too much of your time were I to attempt to traverse the ground which so many have trod, but I think it is to be regretted that Mr. Pearson should not have been allowed to act on his own matured judgment, and, with the most profound respect for the Archbishop's opinion, I cannot but think that the rebuilding of arches of later date, interfering with the original design of the Norman arcade, which had once a reason, but now will have none, is a requirement of the letter, rather than the spirit of correct restoration. As to the upper part of the tower, opinions must and will differ, and the solution agreed upon is undoubtedly safe; but, personally, I should have preferred to see Mr. Pearson's fine design for rebuilding completely carried out.

As regards the new public offices, not much advance appears to have been made. The model recently exhibited has drawn forth many strong expressions of opinion and some useful criticisms, but others might have been spared had it been entirely accurate and accompanied by explanatory plans and sections. Surely it was worth while, more especially in a case like this, one of so much importance to the future of London, to have made an entirely new model, instead of exhibiting lines of roadway and buildings no longer extant, and omitting others all important for proper comparison with the proposed new buildings. (Applause.) The model may have been useful in showing to the public what has long been the opinion of many architects, that the site is insufficient for the buildings proposed to be put upon it. But for any supposed deficiencies resulting from that cause, the architects whose plans have been accepted are, of course, in no way responsible, and I cannot but think they have been subjected to some unfair criticism which more careful consideration would have shown they do not deserve. Larger courts and more through openings would, no doubt, be valuable, but when a certain amount of superficial area in internal accommodation had to be provided, and all the requirements of structure to be substantially met, the difficulties of the task were enormous, and the result as good as, under such circumstances, could reasonably have been expected. It may, nevertheless, be useful to state, what I am assured by the architects is an exactly ascertained fact, that within the external lines of each site the superficial area of courts provided by the plans as compared with that covered by building, is larger in this case than in the Palace of Westminster or the Royal Courts of Justice, and but very little less than that in the new Foreign Offices; but this is, of course, irrespective of any question of height or distribution.

It is one of the misfortunes of our densely-crowded city that space is so valuable as to forbid much lateral expansion, and, as a consequence, what is wanting in breadth has to be given in height, which, in a climate like ours, involves a serious interference with air and sunshine. Height is no doubt an element of grandeur

in architecture, but if unaccompanied by surrounding space it may become a serious evil. When engaged in the examination of the plans for the new offices, I represented to the judges the seriousness of this consideration in respect of the frontage next Whitehall, where the roadway is narrow, and the building proposed very lofty. In the revised plans the difficulty has to a certain extent been met by recessing the main front about 30 ft.; but it will not remedy what to my mind is a defect of considerable importance, and which could only be completely remedied by a considerable extension of area. What the difficulties may have been in obtaining more space, and especially the frontage towards Charing-cross, at present, with the exception of the banks, occupied by such comparatively low mean buildings, I am unable to say; but, I think, it is much to be regretted that when an important work like that now contemplated, and which ought to be a great metropolitan improvement, had to be effected, the additional land was not secured, however large the cost might be.

Surely, in view of its vast importance to the future of London, the right solution of this question, in an imperial rather than a merely financial sense, is a thing much to be desired, and one that this Institute would do well in endeavouring if possible to promote.

I think it must be gratifying to all of us, that for the new bridge proposed over the Thames, the design of our past-President, Horace Jones, has been accepted for execution. We may all be grateful that London Bridge is to be left untouched in its noble simplicity, and that to our brother architect has been committed the far more congenial task of designing something entirely new. Mr. Jones has favoured me with a sight of the general design, and a brief description of the construction to be followed, but it is obviously to be a work of so much importance and interest that it would be wrong for me to attempt in this address to describe it in detail, and I gladly forbear to do so, in the hope that our friend may one day give us something much more valuable than I could presume to put before you on an evening like the present. I may, however say this much, that the design in its general outlines is strikingly original in character, and, as regards the towers, affords the architect a rare opportunity of rivalling in massiveness and simplicity of structure the great works of antiquity, which no one can contemplate without satisfaction and delight. Mr. Jones further informs me that an Act of Parliament was obtained authorising the Corporation of the City of London to erect this bridge, after a contest lasting nineteen days before a committee appointed by the House of Commons, and seven days before a committee appointed by the House of Lords. Mr. John Wolfe Barry was the civil engineer under whose advice application was made to Parliament, and his skill, talent, and experience contributed in no small degree to the success of the Corporation in obtaining their Act of Parliament.

On subjects not immediately connected with architecture, but of serious importance as regards the healthfulness and beauty of our vast and ever-growing metropolis, I think it may not be out of place to notice the movement that has been set on foot for the acquisition of land for a North Metropolitan Park, supplementing, as it is proposed, in a very necessary way the original purchase by the Metropolitan Board of Hampstead Heath. Possibly few people, except those who have studied the subject on the spot, and have watched the ever-advancing tide of bricks and mortar, have realised what a terrible loss it would be to the northern side of London if the tract of undulating and beautifully-timbered land between Hampstead Heath and Highgate, including the historical mound of Parliament Hill, were delivered over to the speculating builder. Many years ago our first professional president, Professor Cockerell, proposed a plan, which, if it had been adopted, would have made a noble approach to a beautiful suburb; but that, like many another fair proposal, was thwarted, and finally dropped. Mr. Cockerell's plan was published in the *Builder* of July 2nd, 1853, and accompanied by an excellent editorial article, from which I quote the following passages. The editor says:—

"The effect of parks and pleasure-grounds on the health, the manners, and the happiness of a great metropolis, has been wisely felt and distinctly recorded from the earliest times. Hampstead Heath is one of the loveliest spots in the kingdom, and we would aid those who are seeking to keep it in its present state for the health and delight of the people:—

'Cold must he be who ever gazed
Impassive on its beauty.'

If we make a circuit around the rapidly-increased suburbs of the metropolis, we can find no spot concentrating so many advantages for a public park as Hampstead Heath; indeed, it is unique, and may challenge the great cities of the world for a parallel suburb. Its height,—no less than 425 ft. above the Thames,—commands views extending over the vast metropolis from east to west,—to Shooter's Hill on the one side, and on the other to the Surrey and Berkshire hills, embracing Windsor Castle,—and an interesting country of surpassing beauty and variety, and proverbially healthy. Its sandy soil, of vast importance in our humid climate, ensures at all times a dry and healthy recreation-ground; and in accessibility to all classes from all parts of London it is unrivalled already, and the projected lines of rail from the East of London will render it still more convenient. It has long been the school for landscape artists. It is to London what Fontainebleau is to Paris, and the extent to which its picturesque beauties, undulations, and the wildness of the Heath are enjoyed by the humbler classes on Sundays and holidays is refreshing to behold."

But Hampstead Heath, on the side next London, without the acquisition of the adjoining land to which I have alluded, would be deprived of almost all the beauty so eloquently descanted on by the Editor. It would, in fact, become a mere narrow strip of brown grass, shut in by houses on either side, and this is the part which, more than any other, is the people's recreation-ground. The scheme now before the Metropolitan Board is entirely practicable, if only the cost of it can be met; and it has, I believe, been clearly shown by experts that it can, without imposing any appreciable burden on the general community. Looking to the future of this metropolis, it is one of such vital importance for the health and recreation of toiling multitudes, that it is to be hoped it will be viewed by the Board, not as a mere local matter, which in no sense it is, but as it is in truth, one of metropolitan, not to say national, importance. Anything that concerns the healthfulness and beauty of our great city ought to be a subject of interest to us as architects, and for that reason, as for others, I think this movement is quite worthy of the sympathy and support of this Institute.

Another subject, akin to this in one sense, has occupied much public attention during the passing year, one of vast importance to the well-being of the community, but by no means easy of solution,—"the housing of the working classes." One considerable difficulty as regards artisans connected with building is the migratory nature of their employment. Men must live near their work, or lose much time and cost in getting to and fro, and this must needs interfere with the occupation of a settled home, so conducive to the comfort and general happiness of life, and it is one that cannot well be met by legislative enactments. But the roving tendency is not confined to artisans, and with others, as with them, it produces similar results. The most serious matter, however, is the condition of the houses inhabited by the very poor. Sad it is to contemplate, and most seriously difficult to devise a remedy. As regards provision of buildings, much may probably be done by architects who have the charge of estates; but the other difficulty is far more serious, and will require the highest wisdom in social questions effectually to grapple with what is not only a difficulty, but involves a serious danger to the State. It is to be hoped that much good may result from the investigation of the Commission, which has recently presented its report, and of which, amongst others, our Fellow, Mr. Godwin, was an active member. Few, if any, men living have done more than he in persistently working in this subject, to which, to his honour be it spoken, he was one of the first to draw the public attention (applause). It is a subject for architects to ponder, and therefore not, I think, out of place in an address to the Institute.

As regards our Colonies, we have lately entered into relations with the Auckland Institute of Architects (New Zealand), founded in 1880 on the lines of our own body, which I trust may bear fruit in the future; and with Mr. W. W. Wardell, of Sydney, the honorary secretary for Australia, our communications are very frequent.

It is each year a sad necessity to record the losses sustained by death. I have already spoken of those of men pre-eminent in their connexion with our own body, but there are unfortunately more to be mentioned, some of whose names were well known to us, and though others may have been less familiar, it is not right they should be left unnoticed.

George Alexander will only be remembered by few, having early retired from practice to the enjoyment of the life of a country gentleman on his estate in Wiltshire, but in his younger days he was well known as a successful architect, and he was, I believe, a friend of Professor Donaldson.

Of Matthew Ellison Hadfield, a name of power in the Midland counties, we have already taken note, and the same may be said of Richard Mackelwaine Phipson, in the Eastern district, a man sorely missed by those amongst whom he practised. John Middleton, of Cheltenham, one of the kindest and most genial of men, was an excellent architect, an artist, and antiquary, some of whose works display, in combination with sound construction, a freshness of design which is always grateful to those who can appreciate good work. His son is still amongst us, and we hope may long continue a labourer in the more special field he has chosen for himself.

William Thompson was a name well known in former years; a lover of Greek art, but of whose works I am unable from personal knowledge to speak.

I am sorry also to record the very recent death of Frederick W. Ordish, of Leicester, an architect of no mean power, formerly associated with that able man John Johnson.

His works were not numerous, but there is much originality in all that I have seen of them, and some of which distinctly show the hand of a master of his craft.

Mr. Ordish met his death in attempting to leave a train in motion, a warning to all, far too often unheeded.

To complete the list of professional members there remain also the names of John H. Sanders, Fellow; Frank Johnson, Alfred Bevan, and Herbert E. Tijou, Associates.

In the ranks of Honorary Associates the hand of death has also unfortunately been busy. In Lord Houghton we have lost a most accomplished man, a poet, and lover of art; and in Sir Watkin Williams Wynn a magnate of the social world whom we could ill spare, and Henry Andrewes Palmer.

Lastly, of Honorary and Corresponding Members we have also to regret the loss of Theodore Ballu, of Paris, and Heinrich von Dehn Rotfelzer, of Berlin.

It is a natural sequence of our obituary that I should record the receipt of a legacy of 19*l.* 19s. from Charles Henman, whose death I mentioned last year; but although legacies are valuable, and to be thankfully received, it is a more agreeable and promising subject of congratulation to speak of gifts from those who remain amongst us, and in which the present year has not been unfruitful. It is not many, probably only very few amongst us, who can afford to make such acknowledgments of professional success as that of our Fellow and friend David Brandon on retiring from office as Vice-President. But such gifts are none the less gracious because they are rare, and it is to be hoped in the future that his valuable example may lead others to do likewise.

Mr. Aldwinckle's donation for one year for encouraging travelling in Italy is a hopeful sign, and the graceful act of Miss Jones in endowing a scholarship for the study of coloured decoration in memory of her lamented brother, that great master of the art, is one for which we may be truly grateful, and it is allowable to hope will keep his memory green in the minds of many yet to join our ranks and participate in its benefits. Opportunities are constantly occurring for the disposal of such gifts, and they may all be made to tend to the essential object of our existence, the advancement of the knowledge of the art we profess.

Finally, gentlemen, it is I think indisputable that as in the body politic so with us, with the enlarged franchise must come increased responsibility, and I would fain remind our younger brethren, the Associates, so full of fire and zeal for the higher work of the Institute, that its future must rest with them; and if I may again, and with a difference, quote my own words, I would say that as the aim of its founders was high, so let their standard be raised still higher. The work which their predecessors commenced in weakness let them continue in strength, and, disregarding all mean and petty jealousies, let them labour, not so much for their own material interest as for the true and loyal promotion of the great art which they profess, and for the maintenance of that

high and honourable character which it was the great object of our founders to establish.

Let them, in the words of the poet, be like the youth

"——who bore, 'mid snow and ice,
A banner, with the strange device."

and died

"Still grasping, in his hand of ice,
That banner, with the strange device,
Excelsior!"

[For a report of the proceedings which followed, see p. 659.]

COTTAGES FOR RURAL DISTRICTS.*

This series of designs and descriptions,—dedicated by permission to H.R.H. the Prince of Wales,—is the work of an architect who has had a large practical experience in the erection of the particular class of structures whereof he treats, and as such he is entitled to respectful attention. His book,—which is without an index,—comprises eight plates of plans and elevations for cottages of many kinds, an introductory essay on cottage building, and a specification, intended, we presume, for the assistance of the otherwise unassisted amateur. With the views expressed in the introduction we are almost wholly in accord, and, indeed, they have long passed the controversial stage. But on one or two points we are not quite at one with the writer, and think that some of his statements, though true in the main, require,—looking to the hands for whom the book is evidently intended,—some qualification, *e.g.*, in stating that gravel and other open soils are the best for building upon, it is necessary to observe that these should not overlie a retentive substratum: if they simply fill up a clay basin they become mere sponges filled with impure matter, and are worse than clay itself.

Nor are we quite certain that leaving the cottager to distribute the chamber, scullery, and other foul water over the garden is a prudent course, for the chances are that he will simply throw it out of doors and it will lie about in puddles to saturate the foundations. Again, we are not in favour of providing in labourer's cottages that "best room" which the author's plans are never without. Such rooms are wasted, and their area would be more profitably divided between the kitchen and washhouse. To make the kitchen, which is really the living-room, capacious and comfortable is the first importance; the "best room" is a luxury which, in the majority of cases, can well be spared.

We are surprised that the author has given no information as to the cost of his (presumably executed) designs. The "close contriver" of such buildings finds that to be the "crux"; and the task of providing a three-bedroom cottage for 100*l.* has puzzled many a wight. The cottages designed by Mr. Menzies are far over this mark, and range apparently from about 225*l.* to 575*l.* each,—the former in rows, the latter designed for superior occupation. These rates are too high to be of general application, and they are due in a measure to the provision of that "best room" which might, in the lower class of cottage at least, be usefully omitted.

In designing the plans compactness has evidently been earnestly sought, and nothing could well be more compact than these plans. But Mr. Menzies has not always,—indeed he has seldom,—observed his own caution as to the relative positions of doors and fireplaces, and in most of his designs a cosy fireside would be an impossibility. The "best room," in plate i., is an example, and plate iii. is worse, for every fireplace,—except that in the scullery, which is of no importance,—is directly flanked by the entrance-door. These little things show that in so small a matter as designing a labourer's cottage there is room for thought and scope for the exercise of considerable skill. The best plan of the series is that for a double cottage (plate vi.). But here we are compelled to take exception to the position assigned to the linen-closet, which is placed against the outer wall, with a south-west and, therefore, a wet aspect, and far removed from any fireplace. It should, if possible,—and it generally is possible,—be arranged so that the kitchen-flue, as being the most constantly used, passes close to it and helps to air its contents,—a precaution about which cottagers are notoriously careless. Another closet near the kitchen fire to dry the labourers' wet clothes when he returns from work is a very desirable provision. One other point, and our fault-finding is at an end. The bed-rooms do not always afford satisfactory accommodation for the bed. This article of furniture should be plotted on the plans invariably, and the windows, doors, &c., accommodated to its comfort. In the plans before us it must, for the most part, be placed opposite the door, or partly under the window, or both. But it is more important that the bed should be warmly placed than that the windows should be externally symmetrical, or be placed centrally in the gables. Mr. Menzies has displayed considerable ingenuity in planning and grouping his cottages, and he will not, we feel sure, take it ill if we suggest the direction in which still further excellence is attainable.

His designs are set out in clear and precise drawings, and he has had the good taste to abstain from endeavouring to obtain for them a worthless admiration by presenting them to us tricked out in the effective but misleading sketchiness which is generally thought to be the fit accompaniment of such subjects.

* Cottages for Rural Districts. By William Menzies, Architect. Windsor: Wm. Clarke.

Illustrations.

ALTAR CLOTH, LAMBETH PALACE.

THIS altar-cloth was executed for the private chapel of Lambeth Palace last year.

Owing to the richness of the decoration of the building, it was necessary to make the covering of the altar as rich as possible: plush was therefore selected, the frontal itself being composed of this material, of light terra-cotta colour, stamped with a specially-designed pattern, while the superfrontal and covering of the super-altar are of dark terra-cotta plush unstamped.

The whole of the needlework is composed of silks of various colours and of Japanese gold, the latter being used both in solid masses and for outlining certain parts.

It will be seen by the phœnixes on the superfrontal that the main idea of the design is symbolical of the resurrection. It will be found that this thought practically pervades the whole design; but the phœnixes being the chief symbol, it appeared well to emphasise them as far as possible: their bodies have therefore been embossed to a considerable extent,—about three-eighths or one-half at the highest point,—by means of pillows laid underneath, over which has been worked solid Japanese gold, the feathers being indicated by the varying directions of the strains; the main feathers of the wings are also slightly embossed, while the eyes are of amber-coloured glass with black pupils, such as are used for stuffed birds. The aureoles round the heads of these birds are composed of Japanese gold and yellow filoselle about half and half, and the flames and ashes are entirely of filoselle, red and yellow.

The plants occurring between the phœnixes are of green filoselle of various shades, the flowers being coloured somewhat after the manner of the eyes in a peacock's tail.

Very little Japanese gold has been used on the frontal, it has only been employed for outlines to the cross and in similar positions; the whole of this work is, therefore, practically in filoselle.

The colour of the cross is mainly of shaded gold deepening into dark terra-cotta, but the colouring of the birds on the stoles is very bright and varied,—the predominating tints being blue and yellow.

The fringes are all of silk, the bottom one partly tied, whereby a dark red plush backing is shown: the strips of needlework above the fringes are enlivened here and there with gold and silver spangles.

It should be mentioned that the cross is mounted upon an unstamped plush *appliqué* of the same colour as the frontal.

The covering of the super-altar is diapered with gold-coloured filoselles, large circles containing flowers, and small circles containing jewels, being introduced at intervals,—the whole in silk.

The work was very beautifully executed by the Sisters of Clewer.

J. Arthur Reeve.

NEW CHURCH NEAR NETLEY.

The Church of St. Edward, Netley, is now being erected about a quarter of a mile from the abbey, upon a site given by Colonel the Hon. H. Crichton, who is also a liberal donor to the building fund. The church is being built of Portland stone, with dressings of Doulting stone from Mr. Trask's quarries. The length of the church is 102 ft., and the width of the nave 24 ft. 8 in. The contractor is Mr. Bone, of London, and the architect Mr. J. D. Sedding.

HULL ROYAL INFIRMARY.

On Thursday last the new wing of this infirmary was opened by Lord Herries. The foundation-stone was laid by H.R.H. the Duchess of Edinburgh, October 1st, 1884, and on both occasions the arrangements were presided over by Mr. Henry Simpson, the Chairman of the Board of Management.

The alterations to be carried out at this building under the direction of the architects, Messrs. H. Saxon Snell & Son, are of a very extensive and important character, for they illustrate the possibility of improving, at a moderate cost, the bad planning and general arrangements of existing hospitals.

It will be useful, therefore, if, in giving an account of the alterations this building is undergoing, we first show what was the original plan, and how injudiciously it has been added to in past years.

The accompanying plan (fig. 1) shows the principal floor as it existed before the present alterations were commenced, and the rooms are so numbered as to indicate the various additions that have been made from time to time.

The building was originally designed for the accommodation of seventy patients, and consisted of three stories of rooms, numbered from 1 to 10 on the plan, ranged along the principal front, and connected together by means of a corridor running along the back front. The foundation-stone of this part of the building was laid in the winter of 1782, and the building was opened on the 1st of September, 1784. Its cost was 3,000*l.*, but the total outlay, including the site and other expenses, is stated to have been 4,216*l.*

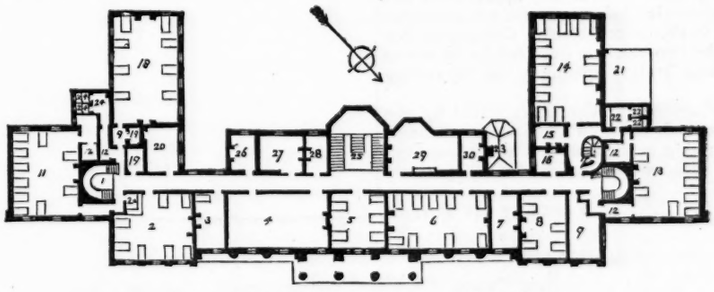


Fig. 1.—*Plan previous to present alterations.*

In the year 1842 the external brickwork was cemented over, and the façade next Prospect-street re-designed by Mr. Lockwood. The wings containing the wards and offices numbered upon the plan from 11 to 13 were also added, and so far the building was as good a hospital as any erected at that date, and before the introduction of the pavilion or block system of construction. But the work of deterioration shortly afterwards began, first by the erection in 1858 of a wing containing the rooms numbered 14 to 17, then in 1853 the commencement, and subsequently in 1864 the completion of the wing containing Nos. 18 to 20, thus cutting off

much of the sunlight from the rear portion of the building, and destroying the free circulation of air that previously existed round all parts of it.

The additional offices numbered 21 to 24 on the plan were also added at various times, but the climax of injudicious extension was reached when the three stories of rooms numbered from 25 to 30 were erected, thus effectually closing in on each floor the only ventilated sides of the corridors of communication. Thus the living-rooms of the officers and the wards containing the sick open in common on to the same unventilated passages, and it will not, therefore, be surprising to learn that Mr. Hagyard, the house-surgeon, found it necessary in his medical report to draw attention to the fact that, although "a great number of deserving cases had to be sent away for want of room and for fear of over-crowding the Institution and rendering it unsanitary," yet that there had been "a great deal of sickness among the resident officials, nurses, and servants principally of a kind pointing to unsanitary conditions of the hospital." Further, he points out that on the contrary the night nurses who, for want of space in the main building are located in one of the adjoining houses in Brook-street, "have been singularly free from sore throats and other septic ailments."

It is, however, not only in the general planning of the extensions above referred to, that errors have been committed, but even greater blunders occur in matters of detail. For example, the small room numbered 2, is a combined scullery and lavatory, with a washing-up sink. Its only light is obtained through the glazed partition that separates it from the adjoining ward, and it ventilates itself into the corridor leading to the sick wards and offices. Again, the air from the water-closets numbered 24 and 22, also passes into the corridor, for these offices are unprovided with cross ventilation, and the higher temperature of the inside of the building consequently induces currents of air to pass from these water-closets along the corridors rather than outwards and through the windows.

This, then, was the condition of the building before the present works were commenced, and we will now describe, by reference to the accompanying plan, fig. 2, what these alterations will consist of.

The separation of the officers' quarters from their present connexion with the sick wards will be effected by cutting two gaps through the main building to the right and left of the centre of it, and removing the sick from the central to the two side detached blocks thus created. At the same time the officers' apartments and the administrative offices generally will be concentrated in the central block. Communication between the two blocks is provided for by means of light iron bridges spanning the separating gaps.

These wings will further be extended by the addition to each of a new arm, three stories in height, running north-west and south-east, and providing accommodation for 78 and 96 patients respectively.

But for the short arms running out at right

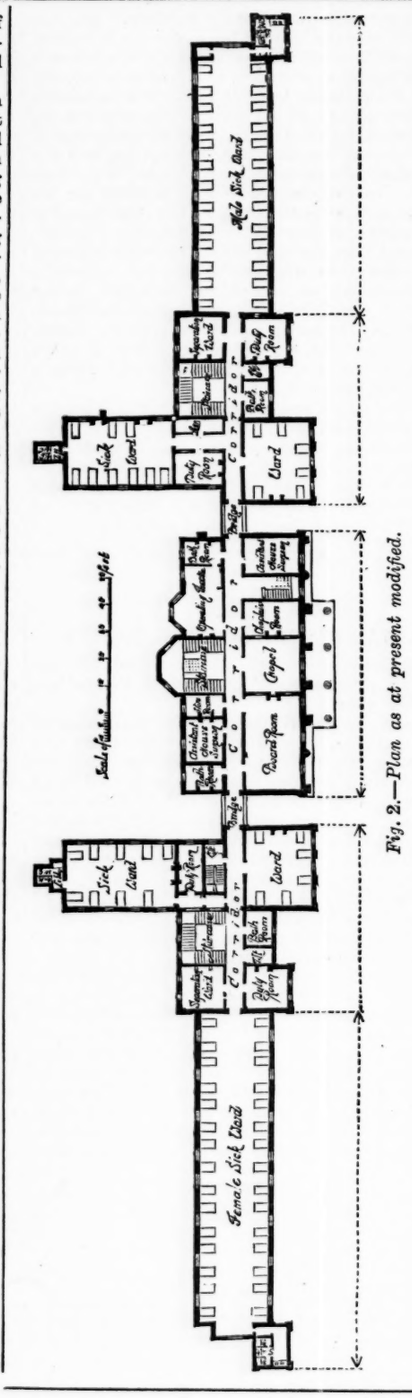


Fig. 2.—Plan as at present modified.

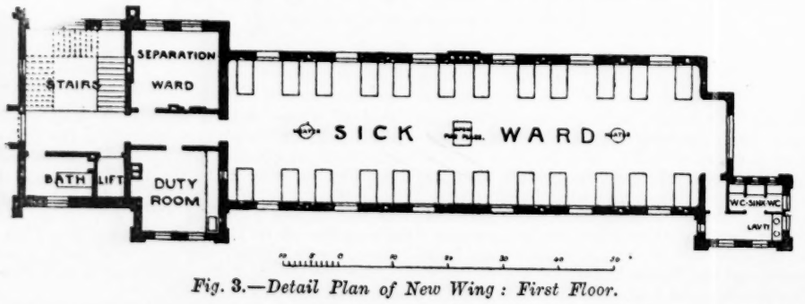


Fig. 3.—Detail Plan of New Wing: First Floor.

angles, to the side pavilion blocks, and which it would have been desirable to remove, did the funds permit of their erection elsewhere, the building, in its altered state, will be as near an approach to the recognised type of English hospital construction as is possible under the circumstances. It will certainly so far as regards the separation of the sick from each other, and from the officers, be vastly superior to the arrangement of the Glasgow Western Infirmary.

In a new building the sick pavilions would, of course, have been removed further from the central administration block, and the dimensions of the wards and the arrangements of their offices would have been in some respects different if unfettered by the necessity of retaining as nearly as possible the levels of the present floors, preserving the external character of the present building and other like considerations.

The central block as altered will contain upon the ground floor the entrance-hall and staircase, a waiting-room, lady superintendent's sitting and bed room, house surgeon's and first assistant house surgeon's sitting and bed rooms, a dining-room, secretary's room, and medical officer's consulting-room; on the first floor a board-room, chapel, chaplain's room, second assistant house-surgeon's sitting and bedroom, an operating theatre and dressing-room. On the second floor the kitchen, scullery, and stores, the housekeeper's apartments and domestic dormitories.

The south-east wing will contain, on each floor, one ward for the accommodation of thirty, one for nine, and one for six beds, and also a separation ward for two beds. One of the wards on the upper floor, being for children, will contain two additional beds; the small ward on the ground floor, adjoining the entrance-hall, will be used as an accident ward.

The corresponding wing on the north-west side will contain, on each floor, one ward for twenty-four, one for ten, and one for six beds, besides a separation ward for two beds; the small ward on the ground-floor will, like that in the opposite wing, be available for cases of accident.

The view we publish shows the new north-west wing and its connexion to the present old building, and the accompanying enlarged plan shows the principal floor of this wing.

It will be seen to consist of a three-storied building, and it contains on each floor a large ward for twenty-four patients, and an adjoining smaller ward for two patients. A bath-room, nurses' room, lift, and staircase is attached, and at the extreme end there is a well-planned lavatory, with water-closets and slop-sinks attached (fig. 3). It is to be regretted that the extent of the ground did not allow this ward to be lengthened for the accommodation of as large a number of beds as in the opposite wing.

It has been estimated by Messrs. Snell & Son that the cost of the alterations (exclusive of the out-patients' department, which is a detached building) will be 25,000*l.*, or 93*l.* per bed, and so far as the works have progressed it does not seem that this sum will be exceeded. No doubt is therefore entertained that the building when entirely renovated will have cost little more than half that of a new building.

The works are being executed under contract by Messrs. Jackson & Sons, and other local tradesmen.

LARGS FREE CHURCH.

We give this design *in memoriam* of its young author, Mr. A. J. Grahame (*not* W. A. J. Grahame, as the name appears on the plate by a mistake of the lithographer), whose untimely death we alluded to in our last number. Under the circumstances, we are unable to procure any further details or particulars in regard to the building, which, we believe, is being carried out, or to be carried out, from this design under other superintendence.

From the *Pall Mall Gazette* we learn that the funeral of Mr. Grahame, which took place a few days ago at Highgate Cemetery, was attended by a concourse of mourners such as is seldom seen at the grave of so young a man. The Dean of Westminster, at his own request, read the service.

MUSIC-ROOM, 6, GLOUCESTER-ROAD, REGENT'S PARK.

A new wing, comprising billiard-room, music-room, and nurseries, has been added to this house, the residence of Mr. R. Borwick. The accompanying view shows the interior of music-room, which is 33 ft. by 18 ft. and 14 ft. high, and is generally approved by musicians as being well-proportioned for acoustic purposes.

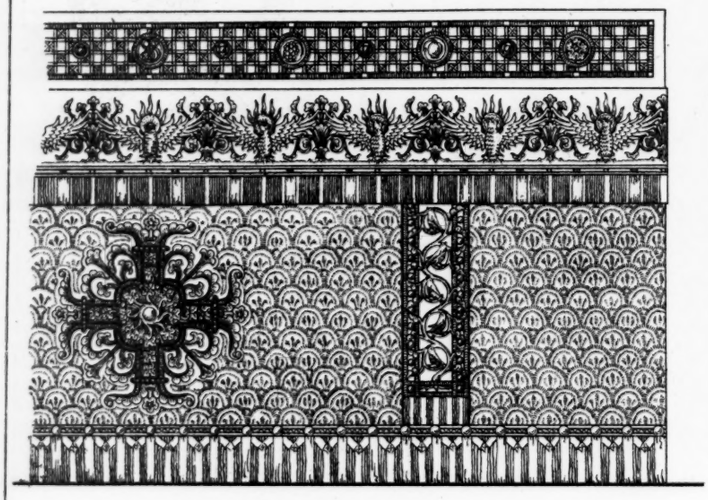
The organ has hydraulic power attached, worked by constant supply.

The work was carried out by Messrs. Taylor & Parfitt, builders, from the design and under the superintendence of Messrs. C. Eales & Son, architects.

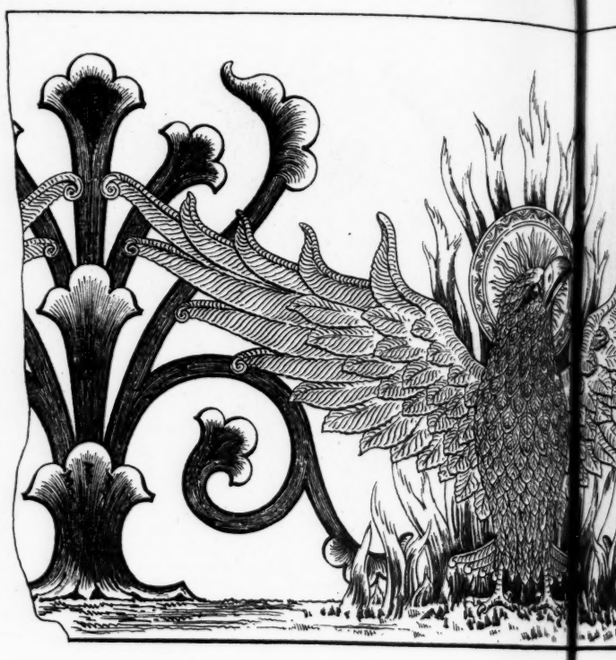
COTTAGES AT SEAL, NEAR SEVENOAKS.

The cottages, of which a view is given, have been recently erected for Sir Charles H. Mills, bart., M.P., on part of "The Wilderness" estate at Seal, near Sevenoaks, Kent. They each contain, on the ground-floor, a living-room, kitchen, and scullery fitted with sink and water laid on, a larder, and a coal-cupboard.

Each cottage has three bedrooms,—the centre has two on the first floor and one larger one above. They are built of red bricks, with stone



GENERAL ELEVATION.

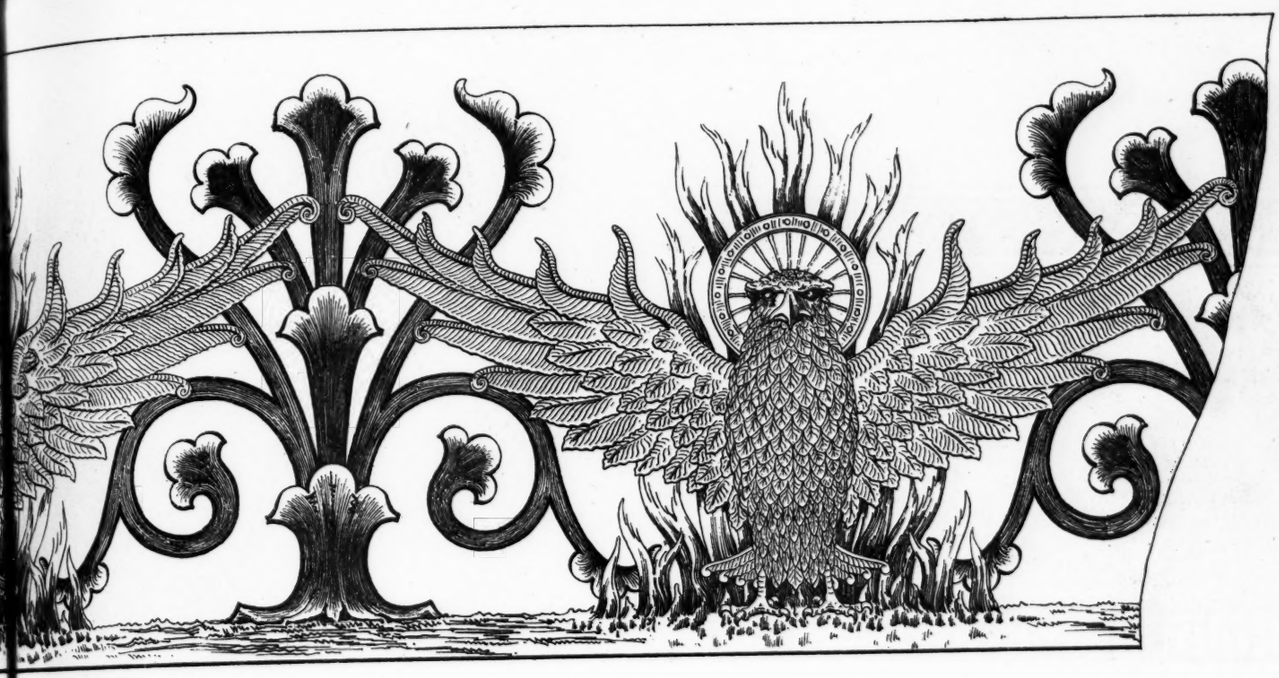


DETAIL OF STOLE.

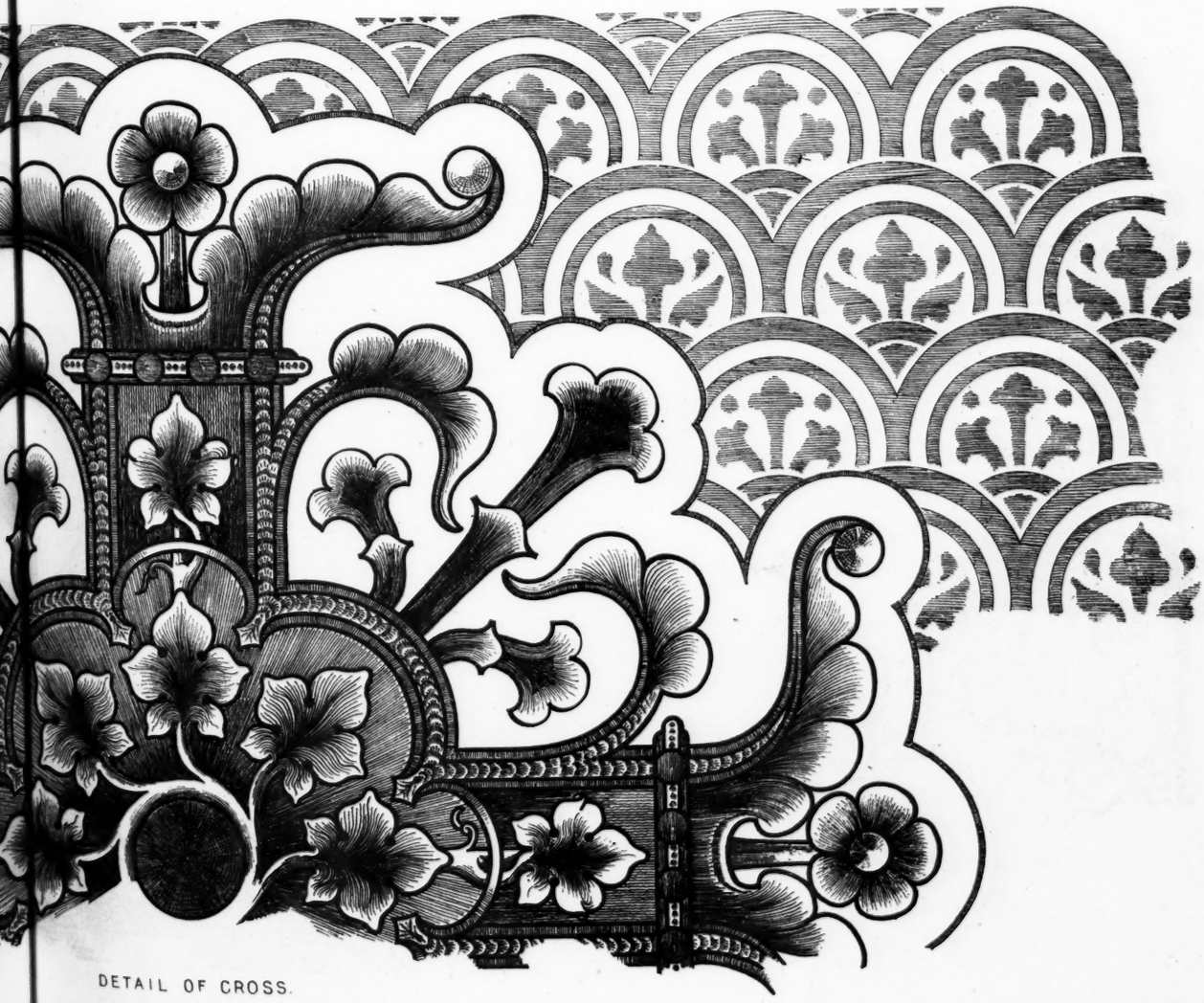
F.T.B. for lith.

C.F. Kell Photo-Lith & Printer.

FRONTAL AND SUPER-ALTAR FOR THE CHAPEL, LAMBETH PAL



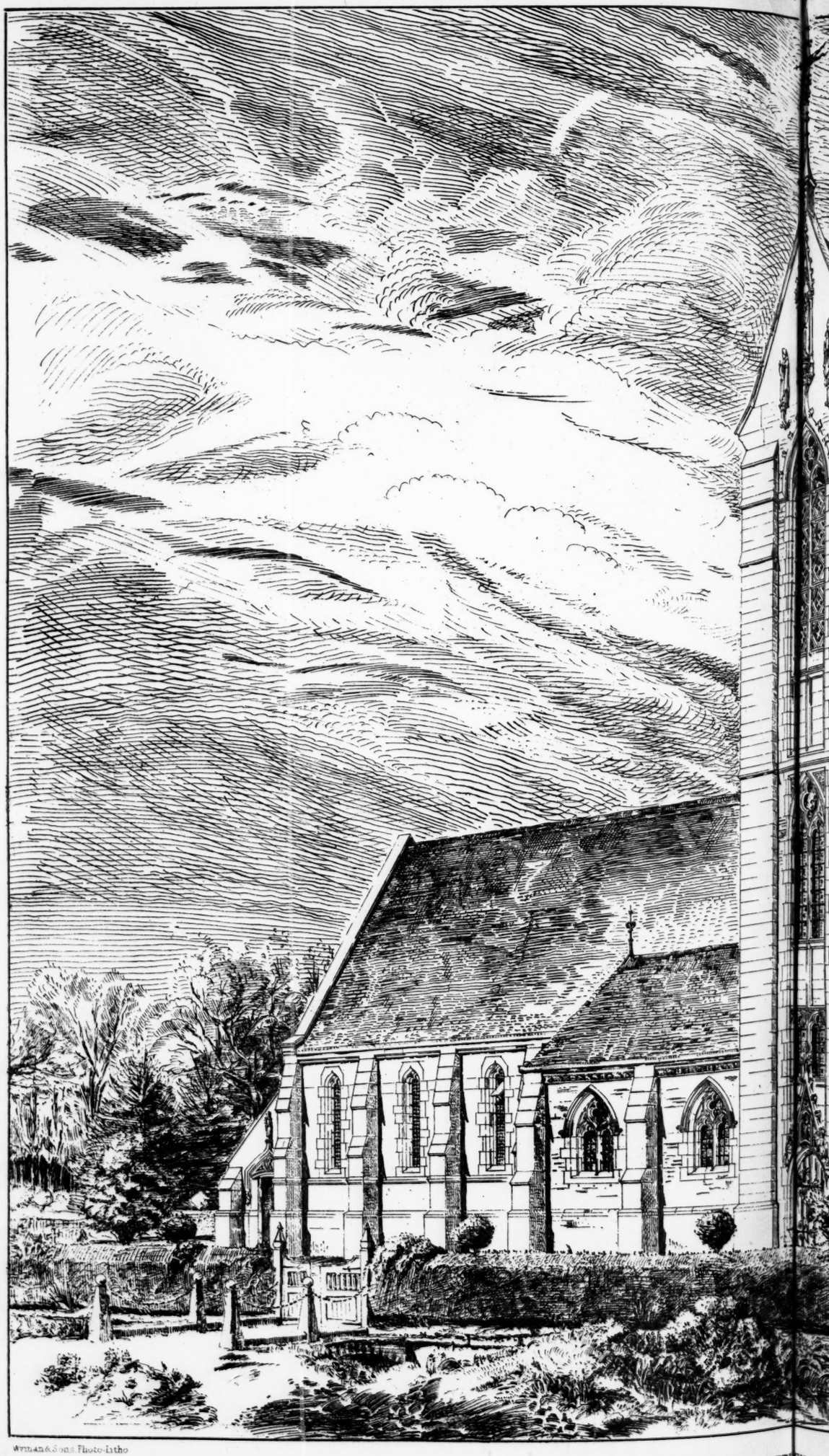
BORDER OF PHOENIXES.



DETAIL OF CROSS.

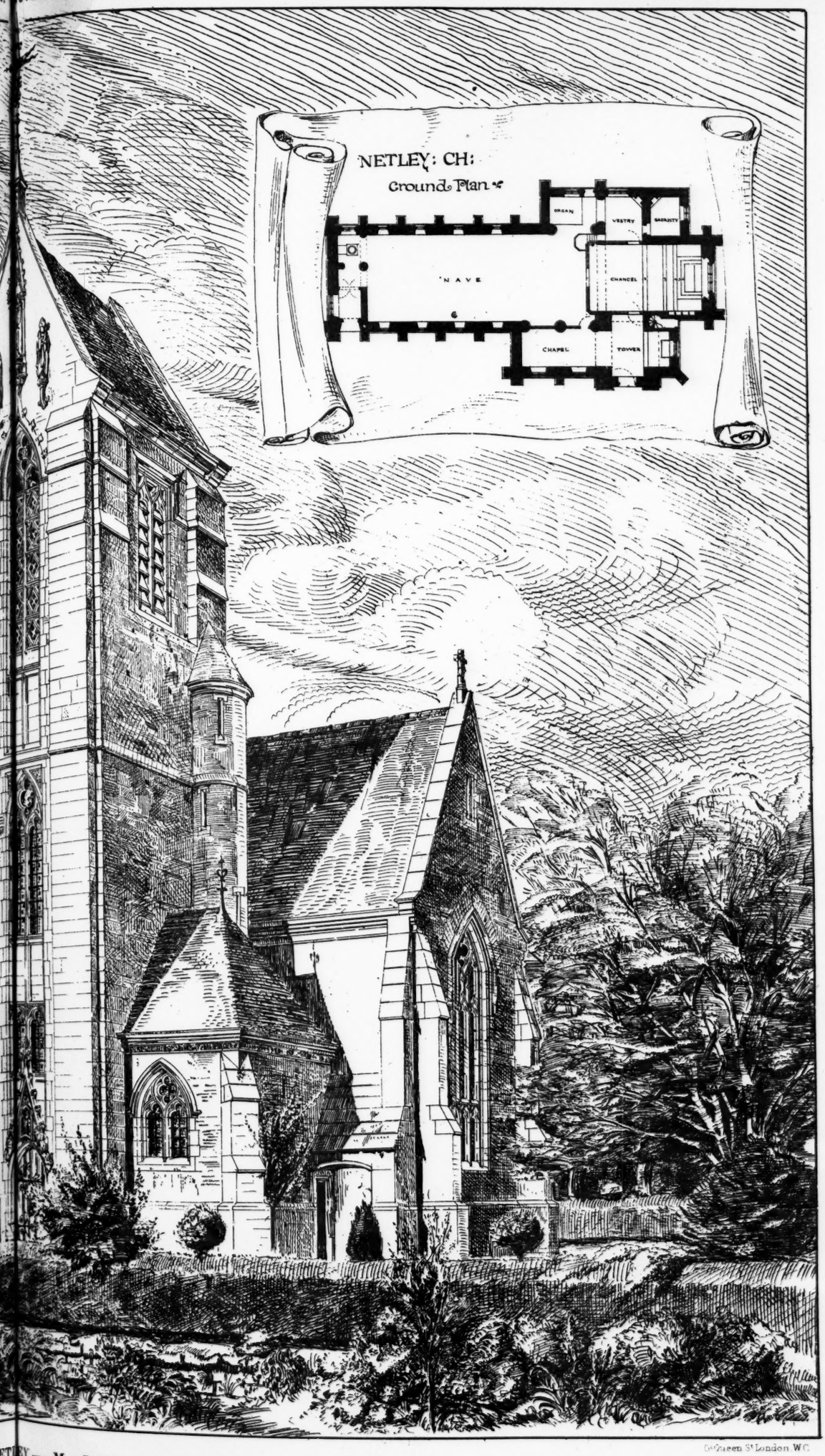
3, Castle St. Holborn, London, E.C.

AMBETH PALACE. DESIGNED BY MR. J. ARTHUR REEVE, ARCHITECT.



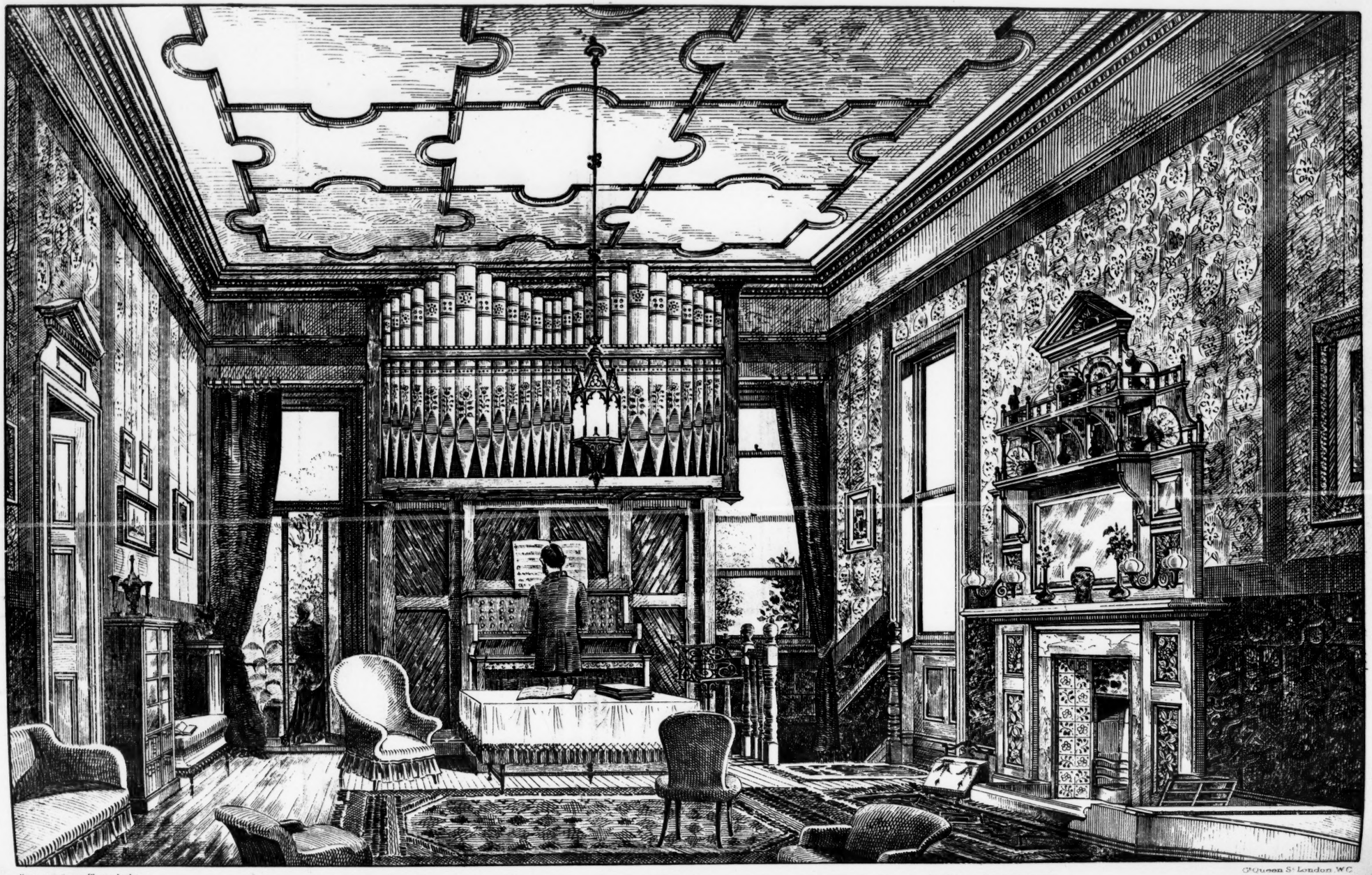
Wyman & Sons Photo-litho

NEW CHURCH, NEAR NETLEY.



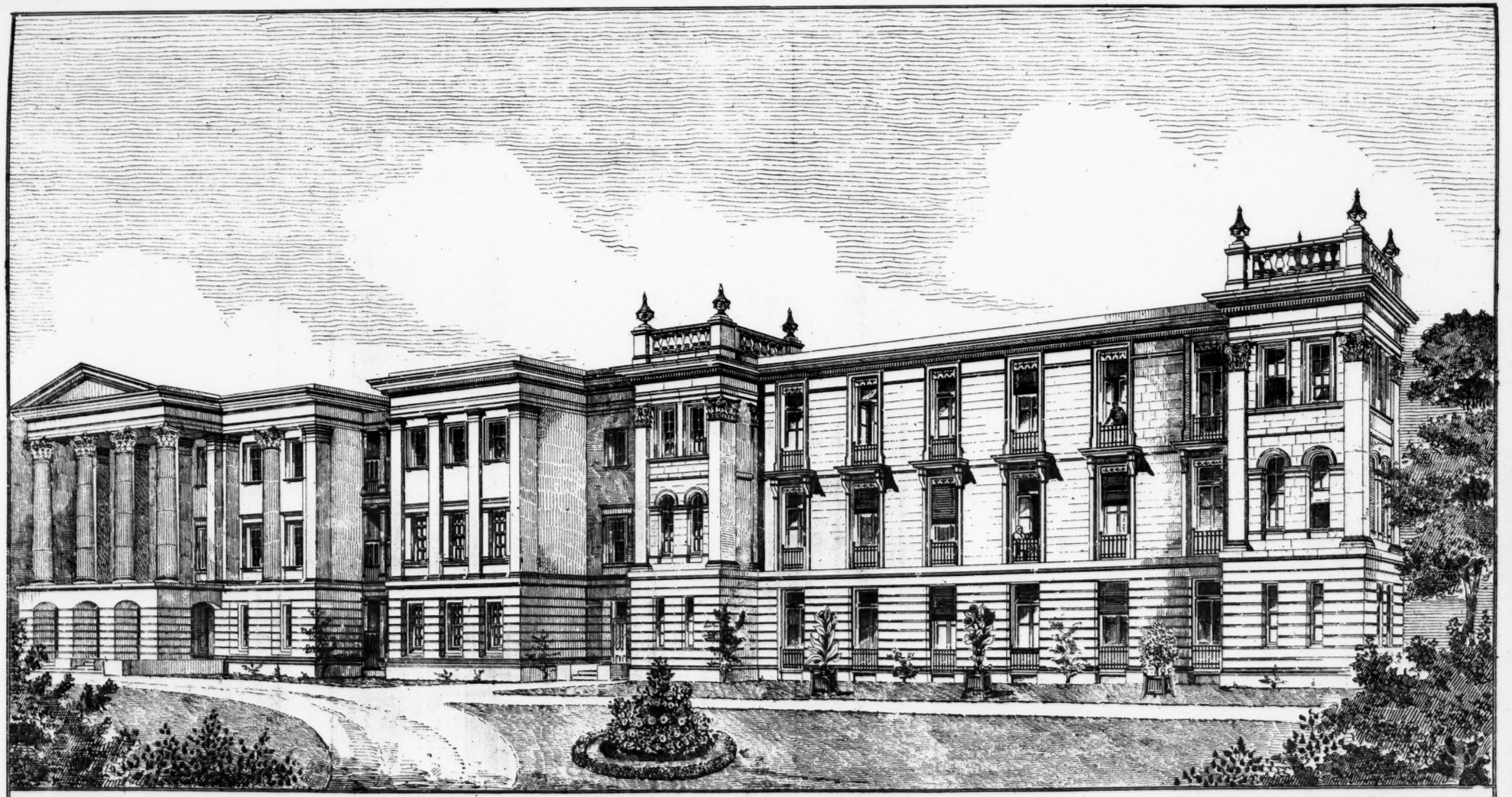
ETLEY.—Mr. J. D. Sedding, Architect.

6 Queen St London WC



Newman & Sons Photo-Litho. 17 Queen St. London W.C.

MUSIC ROOM, 6, GLOUCESTER ROAD, REGENT'S PARK.—MESSRS. C. EALES & SON, ARCHITECTS.



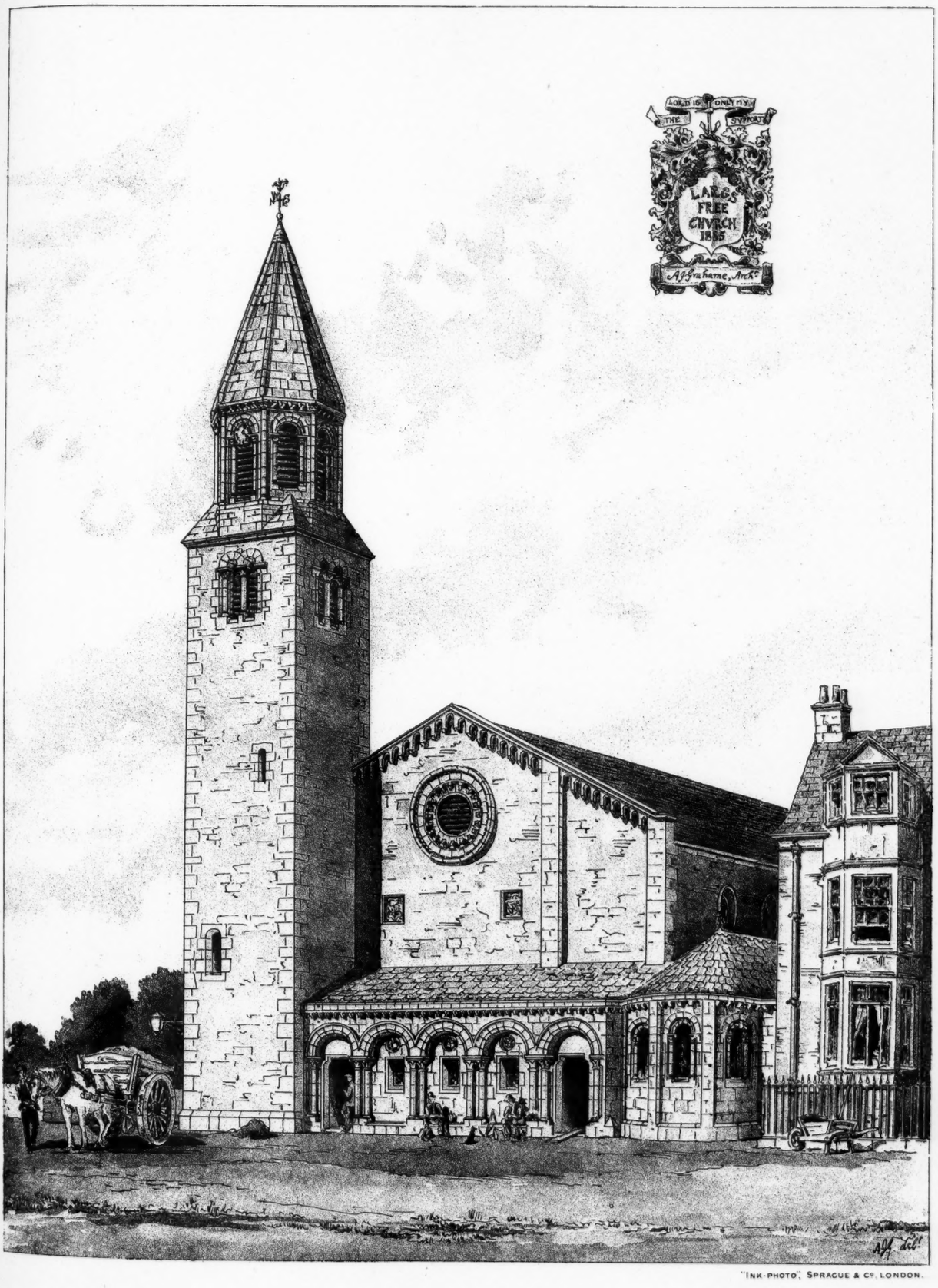
HULL ROYAL INFIRMARY NEW NORTH-WEST WING

MESSRS. H. SAXON SNELL & SON, ARCHITECTS.

Wyman & Sons Photo-Litho. 74 Queen St London WC

"INK-PHOTO." SPRAGUE & Co., LONDON.

COTTAGES AT SEAL, NEAR SEVENOAKS.—Messrs. Hooker & Hemings, Architects.



"INK-PHOTO," SPRAGUE & Co. LONDON.

DESIGN FOR LARGS FREE CHURCH.—THE LATE W. A. J. GRAHAME, ARCHITECT.

plinths, bands, &c.,—the external walls being hollow. The upper and overhanging parts, as well as the gables, are timber-framed, filled in with cement concrete with a roughcast face; and internally the bedrooms are battened, as an extra precaution against damp. The roofs are covered with red pressed tiles, which, as well as the red bricks, are from the Dunton Green brickworks.

The works have been carried out by Mr. W. Wiltshire, of Sevenoaks, under the superintendence of the architects, Messrs. Hooker & Hemings, of 7, Fenchurch-street, E.C.

ARCHITECTURAL SOCIETIES.

Birmingham Architectural Association.—The twelfth annual *conversazione* was held on Tuesday evening in the Library and Examination Hall at Queen's College, Paradise-street. The President (Mr. F. B. Osborn) was supported by Messrs. A. Reading, Doubleday, Henman, J. Cotton (Vice-President), W. H. Kendrick, R. B. Morgan, J. K. Jones, F. G. Hughes, H. H. McConnal, J. P. Osborne, J. W. Tonks, W. Clarke, Dolly, Ayres, Cooper, Spencer, T. W. F. Newton, and others. There was a very good collection of loan drawings, notably some by Messrs. Ernest George and Peto, W. F. Unsworth, E. J. May (London), J. Douglas (Chester), and drawings of works in progress by Birmingham architects. In the absence of Mr. V. Scruton, hon. sec. (who was too unwell to attend), the report was read by Mr. T. W. F. Newton. In it the committee expressed their opinion that the last session had been the best the Association had seen, the classes and lectures being far better attended than previously. The prizes for fire-proof construction and ventilation have both been taken by Mr. D. Arkell. On the motion of Mr. Reading, seconded by Mr. Doubleday, the report was adopted. The President then read his address, in which he dealt with the work of the past session, and urged members to work well and truly for the advancement of their art. Having touched upon the New Assize Courts competition, the President urged members to do all in their power to further the aims of the Association, and to carry out to its fullest their motto, "Design with beauty, build in truth." A vote of thanks was accorded to the President, on the motion of Mr. John Cotton, seconded by Mr. W. H. Kendrick.

York Architectural Association.—On the 29th ult. the opening meeting of the fourth session of the York Architectural Association was held in the Saloon of the Victoria Hall, Mr. A. Pollard, the President, in the chair. Mr. B. Priestley Shires, hon. secretary, read the annual report of the session of 1884-5, which stated that there had been a continued increase of all classes of members, and a marked progress had been made since the Association was started three years ago. The report was adopted. Mr. G. J. Monson, C.E., one of the vice-presidents, read a paper on "Sewage and its Disposal."

COMPETITIONS.

Proposed Law Courts, Birmingham. — The sketch-plans for the proposed New Law Courts at Birmingham are to be sent in on February 1st of next year, when five designs will be selected, and the authors will be paid 100*l.* each for complete plans, to be sent in on June 1st, the 100*l.* merging in the commission in the case of the architect finally selected. Mr. Waterhouse is to be the professional adviser of the corporation in the selection.

New Dispensary, Manchester. — We are informed that the designs of Messrs. Pennington & Bridgen were selected recently in a limited competition of local architects for the new dispensary in connexion with the Hospital for Consumption, Manchester.

New Piers, Bournemouth.—The Bournemouth Improvement Commissioners, under the advice of Sir Joseph Bazalgette, have awarded the first prize in this competition to Messrs. Peregrine Birch, M.I.C.E., and F. E. Robinson, A.-M.I.C.E., for their joint designs; and the necessary powers for the construction of the piers will be applied for in the ensuing Session of Parliament.

Plumstead District Board of Works—Mr. John Rowland, of Cedar-terrace, Old Charlton, Kent, has been elected by the above Board, Surveyor for the parish of Charlton, at a salary of 100*l.* per annum.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE opening meeting of the session was held on Monday last, Mr. Ewan Christian (President) in the chair.

Mr. William H. White (the Secretary) announced the decease of Mr. A. T. Ellison, Associate, and of the Duke of Abercorn, who was elected an Honorary Associate in 1881. Notice had also been received of the death of Mr. Lysandros Kaftangioglon, of Athens, Hon. Corresponding Member, and a very old friend of the late Professor Donaldson.

A large number of donations had been presented to the library since the last meeting. Mrs. Storr, daughter of the late Mr. Thomas Allen, had presented a bust of her father. Votes of thanks were presented to the several donors.

M. Charles Garnier wrote a sympathetic letter regarding the death of Professor Donaldson, and stated that he continued to take the greatest interest in the proceedings of the Institute.

Mr. Barnett, Government Architect, of Sydney, who attended, was presented to Mr. Christian.

Mr. F. W. Farrow, the holder of the Godwin Bursary, was admitted as an Associate.

The President then delivered the opening address of the session, which we print on another page. On the conclusion of the address,—

Mr. H. H. Statham rose to propose a vote of thanks to the President for his able address, in which so many points of interest had been fully and clearly dealt with. He also wished to express on behalf of the meeting the pleasure they felt in seeing their President again at the commencement of a new session. Feeling allusion had been made in the address to the death of Professor Donaldson, and although, as had been said, they might hope that there were others like him, yet all might feel that he represented a very rare class of mind, and one who had left behind him a high standard for the profession. The President had alluded to the coming reforms in the Institute, and it must be a matter of great gratification to everybody to notice how, in the meetings of the younger members as well as in the present meeting, the mention of the reforms had been received with such general testimony of approval. The extension of the principle of examination could not fail to strengthen the position of the Institute by rendering membership of it a real test of professional competency. But one of the most important of the proposed improvements was a by-law by which country members would have an opportunity of voting without coming up to town. Though this might seem a minor matter in some respects, yet, from what he had heard from various country Associates, he believed it would greatly tend to strengthen the position of the Institute, and to make it a really representative body. It was too much to expect the country members to come very often to London to vote, and they would, therefore, feel much more drawn to the Institute, and would take a stronger interest in its proceedings, if they felt that in spite of distance from the metropolitan centre, they were able to take their part and give their vote in its councils. Allusion had been made to important matters in connexion with the treatment of ancient architecture, which had excited a great deal of attention during the last twelve months. In regard to the treatment of Westminster Hall, he would yield to no one in admiration of the genius and learning of Mr. Pearson; but some of them felt it was not so much a question of the actual restoration of the architecture, but rather that, under the influence of certain persons, architecture was to be turned upside down, and rooms were to be made for which a use was to be found afterwards. The true course in building was to know what was wanted, and then to do it. He had been struck in reading the remarkable Blue Book of the evidence given before the Committee, with the fact that it should have taken some 220 foolscap pages of examination to find out what should be done with one face of an old building. Modern architects should be permitted to have a little more confidence in themselves, and not be so afraid of tackling such a problem. Reference had also been made, in the address, to the remarkable controversy about Peterborough Cathedral, and he entirely sympathised with the President's views on the matter. He (Mr. Statham) felt the deepest regret that the eminent modern architect had not been allowed to do what eminent architects in all previous ages had done, viz., to make his own additions in his own spirit to a great building where reconstruction had become absolutely necessary. He entirely concurred with the view taken by the President as to the undesirability of rebuilding the two pointed arches that had been taken down. The desire to rebuild them in a style not in keeping with the immediate surroundings, simply because they were there before, arose, he believed, from one great fallacy which had lately gained grond. This was that architecture was all history, a statement which they were continually having thrust down their throats. Architecture was art as well as history. It was certainly going far afield to call in the Archbishop to settle the controversy, but although he could not agree with the conclusions, he must say that he had read the award with very great respect for the ability displayed in it. The President had further touched upon a question of even more importance, viz., the site for the new War and Admiralty Offices. He hoped the Institute would be able to make its voice heard as to the false economy of attempting to erect such great buildings on a manifestly inadequate site, putting them in and out and behind other structures of inferior dimensions and importance. Every one who read the debates in the House of Commons whenever architecture was touched upon, must be struck by the immense preponderance of purely economical views. The question of art was so tabooed by the assembly that even those members who might be expected to take an artistic view of the subject were obliged to say apologetically that they did not enter into it on artistic grounds. He hoped, therefore, that the Institute would be able to make its influence felt on the Government in regard to buildings which might be either a source of national pride or the reverse. He entirely agreed that the defects in the plans were not to be charged against the architects, who had been forced to put upon an inadequate site what could not be built there consistently with good sanitary arrangements and architectural effect. He believed there was some willingness on the part of those at present in office to hear suggestions on the subject, and these should be made with all the weight which the representations of a professional body like the Institute certainly ought to have.

Mr. Hugh Leonard, Hon. Associate, and late Chief Engineer in Bengal, seconded the vote of thanks. One could not hear, he said, such an address without being instructed, and the hopes raised by it must tend to do good, not only to the Institute in itself, but also to those who were trying to forward its views outside the profession. With regard to the alterations in the by-laws, those who had been partly opposed to them must have felt some satisfaction at the explanations which had been given, while those who were anxious for their passing would be gratified at the result. With regard to the new Government buildings, the general feeling amongst what he would term semi-professional men, was that a great opportunity was about to be lost, and that through motives which ought not to weigh with such an important matter.

Mr. E. C. Robins said that they had heard an address such as might incite them to deeds of daring, and they had really an exceptional case before them. They had heard a clear statement of what had been done with reference to the new public offices. A large number of the members present had gone into the facts of the case, and knew what the requirements were, and the difficulty of putting them on the proposed site. After the admirable way in which the President's remarks had been supported, he was desirous that some action should be taken in the matter. He would, therefore, propose,—

"That the Council be requested to ascertain from the First Lord of the Treasury, or from the proper authority, a plan showing correctly the allocation of the proposed new buildings for the War and Admiralty Offices on the Spring Gardens site, inasmuch as doubts exist on this point, since the model exhibited for the public information at Spring Gardens in August last was incorrect and at variance with the plans published with the Bill; and that the Council be authorised to memorialise the Government, should they think fit to do so."

That would give effect to the admirable remarks of the President and those who had followed him.

Colonel Lenox Prendergast, Hon. Associate, seconded the proposal of Mr. Robins. Circumstances had led him to have some extended

knowledge of how troublesome it was to get anything done in London. The metropolis seemed to be different to any other place in the United Kingdom. The want of interest taken in anything by Londoners was most extraordinary, therefore he hoped a great body like the Institute would endeavour to lead the public. Any one who had gone into the matter must be aware that the architects had had imposed upon them a task almost beyond the power of any man to fulfil. Nearly all the *employés* had to be provided with separate rooms, simply because they had been accustomed to do their work in a lot of private houses. When firms, such as bankers and others, were building magnificent halls for their *employés* to work in, it seemed an anachronism to vulgarise a great national building by cutting it up into a lot of small rooms. He was afraid it would not be possible to deal with that, because certain conditions had been insisted upon in a hole-and-corner manner. At the same time, the Institute might express an opinion upon the utter inadequacy of the ground on which the buildings were proposed to be erected. He hoped the Institute would approach the authorities with no desire to interfere with their wishes generally, but merely to point out from experience of sites of this character, what a terrible mistake was being made.

Mr. William White, F.S.A., suggested that Mr. Statham's motion of thanks to the chairman should be dealt with first. The vote of thanks was accordingly put and carried by acclamation.

The President replied, and agreed with Mr. Statham that the judgment of the Archbishop was most carefully drawn in every respect, but he could not agree with His Grace. The arches mentioned by Mr. Statham, and which Mr. Pearson did not wish to rebuild, were put in on account of the failure which had occurred in the tower. This was absolutely without foundation, and was as rotten as a pear from top to bottom. The builder, who had thought that he would get a great quantity of material out of the old piers to rebuild the new ones, found he had only to cart away the rubbish. There was a remarkable circumstance connected with the foundations of the tower,—the original builders had gone down within 18 in. of the solid rock, and stopped in the soft ground. These arches had been put in because of the failure there, but now that the tower stood on a thoroughly sound base it required no arches or extra support. There was power enough in the piers which Mr. Pearson had built to carry any weight that could be put upon them. The arches, therefore, were an anachronism,—like the work of the Chinese tailor, who, on being told to copy a coat, copied patches and all. As to the site of the new War and Admiralty Offices, of course, the competitors had to deal with the outline given them. His quarrel with the site was not that it was a bad one, because, without doubt, it was a splendid position for a great public building, but that if it were carried out on the lines laid down, it would perpetuate what might have been a good thing some centuries ago when there was comparatively little traffic. Whitehall below was wide enough, but in the neighbourhood of Charing-cross it was absurdly narrow, and quite unfitted for a lofty building immediately contiguous to the pavements. On that ground, therefore, he would like to see it altered. He did not agree with many as to the insufficiency of the plans, which were to his mind remarkably good. But what was wanted for the future of London was a wider thoroughfare in that part if great public buildings were to be placed there. The modification might, doubtless, cost a hundred thousand pounds more, but what was that to a great nation like this in connexion with one of the greatest improvements to be made this century, and which, if not made, would be an everlasting disgrace?

Mr. J. Macvicar Anderson (hon. sec.) proposed a vote of condolence with the family of the late Professor Donaldson; also a vote of thanks to them for drawings handed to the Institute.

This was seconded by Mr. Charles Barry, and agreed to.

The resolution proposed by Mr. Robins being then before the meeting,

Professor Kerr remarked that its wording would require a good deal of alteration before it could accord with the peculiar position of the Institute in the matter. But, with regard to the spirit of the resolution, he would like to say a few words, and first he would allude to the committee which had been appointed by the Council on his motion. Although they had not yet reported, they had done all their work, and some of them felt it was judicious to wait for a few weeks before committing themselves to anything direct. He was not justified in saying what the result was at which the committee had arrived. With regard, then, to Mr. Robins's proposal, he, for one, thought it was the duty of the Institute to interfere in public affairs. He was sorry to say that of late years the interference of the Institute with certain Governmental matters had not been so successful as they might have wished. A great misunderstanding obtained with regard to architecture and architects. The real reason for their unpopularity at present,—if he might use the expression,—was that they were living in a sceptical age. Parliament was equally sceptical of all the other professions. If a question of medical science was discussed in Parliament it was treated with considerable scepticism. The Church, the Army, and the Navy were all treated in the same way; how, then, could architecture expect to escape? Notwithstanding all this, it was the duty of the Institute, on behalf of the profession it represented, to be very firm, decided, and persevering, in its interference with public affairs as regards architecture. But in order to interfere effectually it was necessary first to be sure that they were right, and then to go ahead. Although the Government might be willing to hear what they had to say, they would be expected to speak with a perfect knowledge of the subject, and then he believed they would receive courteous attention to what they had to advance. But when they had advanced this, it would be necessary to be firm and decided, to be plain-spoken and out-spoken, and that was what did not prevail in the profession to the degree that it ought. Their proposals should be laid down, and maintained with great pertinacity. One enemy of the profession had spoken very plainly, cynically, and sarcastically about them. He alluded to Sir Edmund Beckett, a typical representative of the public at large (cries of "No, no"). There were not many who could speak with the same sarcastic effect as Sir Edmund Beckett, but a great many would if they could ("No, no"). He knew one man in the room who had provoked Sir Edmund Beckett to reply to the implication that he was an hysterical amateur. Now, if they spoke as broadly as that, and maintained their ground against hysterical amateurs who did not understand matters, there might be some effect. It was the duty of the Institute to interfere in this matter, on which some people seemed to feel so warmly, and if the meeting so determined the Council should give expression and effect to that opinion. But let the Council bear in mind that they were dealing with a sceptical Government, representing a sceptical people, and that it was necessary first to be firmly persuaded of what they desired to have done, and then to maintain their ground resolutely in face of all opposition.

Mr. Charles Barry said he thought they would all agree with Professor Kerr's remarks. The proposal of Mr. Robins treated the matter in the way in which alone they could move. It suggested to the Council that they should first of all possess themselves of the facts absolutely essential for the best argument, and with these facts must necessarily be the official copy of the plan. That plan had not as yet, either on paper or as a model, been made public; therefore the first thing to be done was to ask officially for that plan. He believed it had been asked for from the late First Commissioner, but was not forthcoming. The request might be again refused, but he did not think it would, under the present circumstances. If it should be refused, then the Institute would be justified in taking any action they might think fit on the only information placed before them, viz., the incorrect model which was exhibited in Spring-gardens. This model differed from the plans published with the Bill, and was, as the President had stated, surrounded by all kinds of objects, some of which no longer existed, while others which had sprung into existence, were not indicated; so that there were no means of forming a correct judgment. He had some reason to believe there would be no official difficulty in getting the necessary basis on which to argue, in the shape of an accurate plan. The insufficiency of the site would become evident, as would the impossibility of securing the public improvement of the opening up of the Mall to Charing-cross, which had been so long desired, and which if the plan were carried out would be prevented for ever. The base of action would rest on the plan, and if it should be refused they could then go *à fortiori* upon the model. The last part of the resolution left the form of memorial perfectly open. It would be remembered that the Council had moved in the matter at the outset, pointing out the probable disadvantages of the site, but their views were without avail. These views could again be advanced with great advantage, to prevent this great matter from being a failure for all time. If they did not take action at the present time, the question would by-and-by be asked by the public, the Government, and all those interested,—"Why did not the profession come forward to prevent this?" It was only in England where an important public building could be proposed to be hidden by a tavern, a couple of private banks, and some insignificant shops. This was an imperial and not a mere economical question.

Mr. R. W. Edis, F.S.A., said he thought it would be well, before the resolution was put, to look to the other side of the question. A certain number of architects had consented to send in drawings for this very insufficient site, and were quite willing to accept the commission. They were now protesting, for the first time, against the insufficiency of the site. (Mr. C. Barry, "We protested years ago.") The profession had accepted the site so far, that they had agreed to submit drawings for the building. He entirely agreed as to the insufficiency of the site, but in dealing with the Government of the day, they ought to appeal to the censorship of public opinion, and not to those who would answer them back by saying that, notwithstanding their protests, they had sent a number of competitors into the field, and that their President was one of the judges, who, without protest, had awarded the prizes. The profession ought to take up these questions of public buildings with a stronger hand. In the case of Northumberland-avenue, the protest of the Institute had not been altogether successful, and if they proceeded now on the same lines, he believed their efforts would be again without success.

The President remarked that the last speaker had said he was one of the judges, and that he had entered no protest. His business was solely to endeavour, to the utmost of his ability, to find out the best plan for a building on a certain site. He had nothing to do with the question of the site, and, until he was asked to act as a judge, he had never considered the plan. But he now looked at the matter as an ordinary citizen, and it seemed to him a very serious thing, as regards the future of London, that the narrow neck at Charing Cross should be continued for centuries, when there was a chance of making a really great metropolitan improvement.

The resolution was put and carried unanimously.

The President then adjourned the meeting to the 16th inst., when a paper will be read by Mr. Wm. Woodward, Associate, on "London Re-modelled."

The Works at St. Albans Abbey.—With regard to what has been done to "the once noble and genuine" abbey church of St. Albans, the *Athenæum* of Oct. 31st repeats and endorses the comments made by us a fortnight ago (p. 562), and adds,—

"We have many times expressed our astonishment and sorrow at every step which has been taken by the rash custodians and pseudo-architect who have between them converted the much injured and time-worn but unsophisticated abbey church into a false antique. Anything more miserable than the false front which has been constructed at St. Albans would be difficult to find."

Railway and Canal Traders' Association.—The ordinary monthly meeting of the Council of the Railway and Canal Traders' Association was held at the offices, Eastcheap-buildings, London, on Wednesday last. In addition to the ordinary business, the following resolution was passed:—"That this Council tender their hearty congratulations to the promoters of the Manchester Ship Canal upon the attainment of the object for which they have contended so long, and hereby record their conviction that the authorisation of the scheme is the first great step towards the resuscitation and improvement of our inland navigations."

WOOD-WORKING MACHINERY.

In the course of our general articles on the Inventions Exhibition, which appeared in these pages shortly after the opening, we made reference to the wood-working machinery exhibited in the machine tool department, and stated that we should return to the subject more in detail later on. Want of space has prevented our recurring to the subject till the eleventh hour.

The principal exhibit of wood-working machinery in the Exhibition has been that of Messrs. A. Ransome & Co., of Stanley Works, Chelsea. This firm exhibited a complete machine cooperage in full operation. Those who visited the Fisheries Exhibition will remember that one of the principal attractions in the Machinery-in-motion Department was the cask-making shop, which formed the exhibit of this firm. The plant then shown, however, was for semi-tight casks suitable for packing fish and other goods. The machines exhibited this year are of a different description, being designed for making casks that must be absolutely tight, as they are for holding liquids. The large number of casks turned out at the Exhibition were all taken by a firm of vinegar-makers. Without a series of illustrations it would be impossible for us to make plain to our readers this novel and highly ingenious machinery. We prefer to devote the space at our disposal to illustrating and describing some of this firm's more recent descriptions of wood-working machinery which are likely to be of more direct practical interest to the majority of our readers. We may, however, remark in passing that the casks made by Messrs. Ransome's machinery are, so far as we can judge after a somewhat close study of the subject, more uniform and better constructed than the ordinary run of hand-made casks, and there can be little doubt that the process is far cheaper. Indeed, we do not think it would be a very bold flight to prophesy that before long the trade of the cooper, as a regular handicraft, will have become, through the competition of mechanical appliances, almost as obsolete as that of the wheelwright, and will be confined only to jobbing and repairing work.

The first machine we illustrate is one which, though not new, has attracted a good deal of attention at the Exhibition. This is Ransome's steam tree-feller, or cross-cut log saw, illustrated in fig. 1. The arrangement is very simple, and is well shown in the engraving. The saw-blade is attached to the piston of an ordinary steam cylinder. Suitable guides are provided, and the teeth of the saw are so arranged that the cut is only taken on the inward stroke, so that all risk of the saw buckling is eliminated, and saws 9 ft. to 10 ft. long can be used. For feeding the saw up to the work as the cut is made, the worm and toothed quadrant shown are worked by the hand-wheel, the cylinder pivoting in the centre of its length. Steam is conveyed to the machine through a flexible pipe, so that a considerable space of ground can be

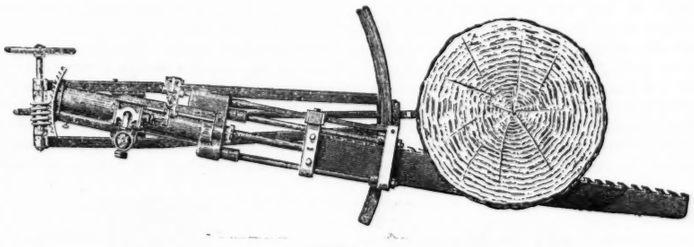


Fig. 1.

cleared without moving the boiler. About a 3-h.p. boiler will work one machine, or two can be supplied by a 5-h.p. boiler. Four men will work any size machine, one to stoke, a second to attend to the apparatus itself, a third to drive in wedges to keep the weight of the tree from pinching the saw, and a fourth to assist generally. The larger-sized machines, for trees of over 6 ft. in diameter, can be moved about easily, on a light timber jim, by two men, the weight being 5¼ cwt. The smaller machines weigh about 3½ cwt. Messrs. Ransome also make a saw on the same general principle, but driven by power from shafting.

Turning to the more ordinary types of wood-working machines we illustrate in figs. 2 and 3, a double deal frame-saw, in which there are one or two novel features. The work is fed up, as will be seen, by vertical rollers. These are both smooth, and are both driven or live rollers. In this way the certainty of the rack-feed is obtained without the loss of time incurred in running the rack back, and the

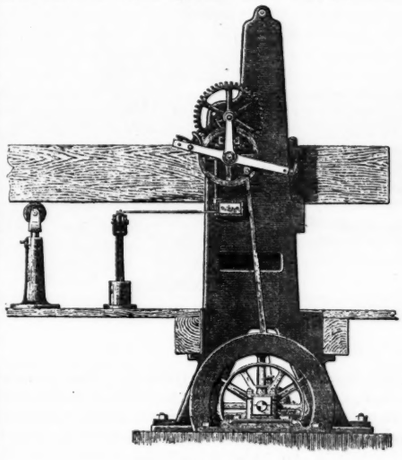


Fig. 2.

wood is not dented as it is when fluted rollers are used. The upper fence-bar can be shifted to allow for battens, deals, or planks being operated on, the rollers on the same side being arranged to accommodate themselves to this

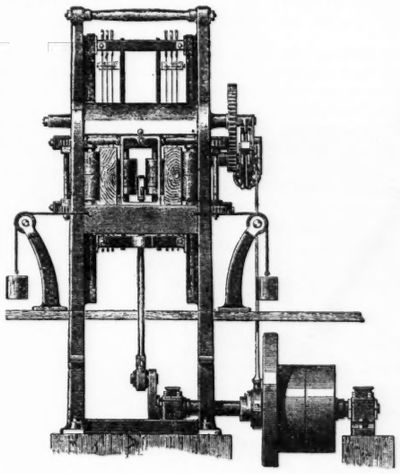


Fig. 3.

arrangement. These rollers on the fence side are pressed up to the work by springs, which act on the back of the bearings, and will thus give to any pressure communicated by the outer feed-roller to the deal. The swing frame is of forged steel, the section being such as to give the greatest lateral stiffness so as to prevent the frame jamming in its guides when several saws are keyed in it at once. Another neat arrangement is the manner in which the transom is hinged so that it may be let down and the saws taken directly out of the frame, when they are required to be shifted, instead of having to be drawn through the top. We should also not omit to make reference to the manner in which the feed-rollers are worked. These are actuated by a wheel with a V-groove in its rim. Into this a pawl with a wedge-shaped end, to correspond to the V on the wheel, engages and is moved intermittently by a suitable attachment. The action is the same as that of a ratchet, but it has the advantage of being quite silent and less liable to get damaged or out of order.

In fig. 4, we illustrate a recent design of cross-cut saw-bench designed for joiners and boxmakers' work. The machines, with a slight modification for the special work, are also much used in cutting blocks for wood-paving. The principal feature in this is that the work is carried on a hard wood table, mounted on rollers, the latter running in planed grooves on the main framing. In this way complete accuracy

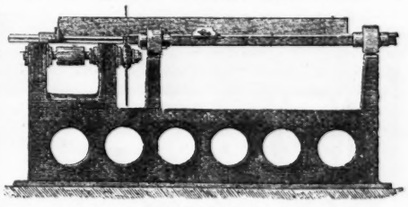


Fig. 4.

is ensured. The table is long enough to take pieces of considerable length, and is provided with a graduated scale for setting it to any angle, so that if there are several pieces to cut of the same shape no setting-out is required when once the machine is adjusted. For cutting short pieces to length a movable fence can be attached. Saws up to 20 in. diameter are mounted, and pieces of 24 in. by 6 in. can be cross cut.

An important wood-working machine tool, recently introduced by Messrs. Ransome & Co., is shown in fig. 5. This is an improved planing and trying-up machine, which will true up stuff, taking it out of winding and at the same time leave a surface smooth enough for gluing. The table on which the work is fixed is fed up and brought back by a rack motion, the difference in the speed of the forward and return motion being about five to one, according to the nature of the work. The speed of feed can be immediately altered at any time whilst the cutters are at work by means of the two diagonal levers shown in the illustration, which shift the belts on cone pulleys. This machine is run at a very high speed, and the irons are attached to an adze block of solid steel, the spindle of which runs in unusually long bearings. Cutters of any required shape can be used so as to cut mouldings, rebates, &c., at the same time that the work is being planed. With this machine, we are informed, one lad can plane and true up all the wood, including panels, for fifty doors in nine hours,—the material being used rough from the saw. This is undoubtedly very quick work. A feature in connexion with this machine should not escape notice. Messrs. Ransome, as many of our readers are aware, have introduced very largely the pneumatic system of removing shavings, chips, and sawdust from the workshop. The apparatus consists chiefly of a series of sheet iron pipes laid down in convenient positions in which a brisk current is kept up by means of a centrifugal fan. In the machine we have just described, a cast-iron box or cover fits over the cutter block, and this leads into a branch pipe communicating with the pneumatic main. In order to compensate for the varying height of the work, an ingenious telescopic arrangement has been introduced, so that there is no inconvenience or loss from the draught being taken in above the cutters. The application is, of course, suitable for other machines of this nature. We have recently had some experience of its working on one of the machines last described, and can testify to the comfort and convenience of the system; indeed, the pneumatic system of clearing wood-working shops where machine tools are used is one of the greatest blessings that have been conferred on those engaged in such establishments. This fact was very fully illustrated during the recent Glasgow meeting of the Iron and Steel Institute, when those members who visited the wonderful Kilbowie works of the Singer Sewing Machine Co. saw vast shops containing hundreds of hands employed on all manner of wood-working machines, and not a chip or shaving to be seen in the place. The effect on insurance premiums that the introduction of such a system would have should pay for the installation many times over in the course of a few years.

The stand of Messrs. Samuel Worssam & Co., of Oakley Works, Chelsea, contains some excellent examples of wood-working machinery, which are shown in practical work. From their

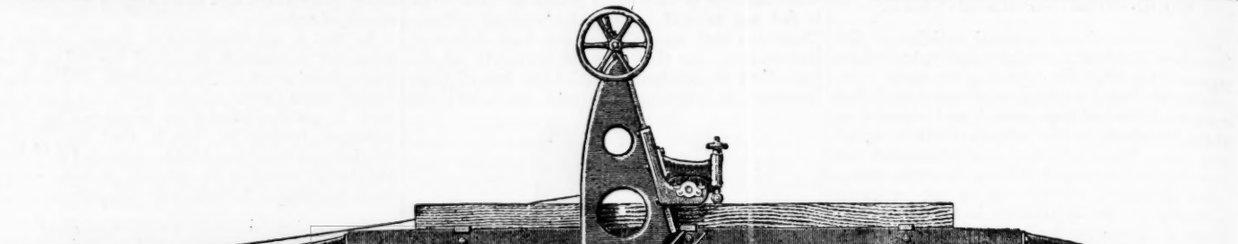


Fig. 5.

exhibit we select three examples for illustration. The general joiner made by this firm is shown in fig. 6. It may be used for sawing with and across grain, mitreing, chamfering, wedge-cutting, single or double tenoning, planing, straight or curved moulding, beading, rebating, grooving, and tonguing. The principal advantage in this machine is that two men can work with it continuously at one time. Thus one hand can be engaged in, say, planing, moulding, and mortising, while the other man is tenoning, grooving, or sawing, and this without interfering with each other when the tools have to be changed. This end is attained by the main spindle being in two parts with separate driving pulleys and countershafts. The bottom cutter-block on the planing side is placed in a slide or draw, so that the box can be readily withdrawn, and the knives set without, the man having to get under the machine: or an extra set of knives can be kept, and placed in immediately. There are four cutter-blocks for working all sides at one operation. There are spring pads for holding the wood down, and side spring rollers for keeping the work up to the fence. The mortise is made, as is usual with these machines, by slot drilling, the work being traversed on a slide by means of the vertical lever. This part of the apparatus is shown on the right of the engraving. With this plan the work is quickly and efficiently performed, but the ends of the mortise are naturally rounded, and have to be squared out by hand to fit the tenon if necessary.

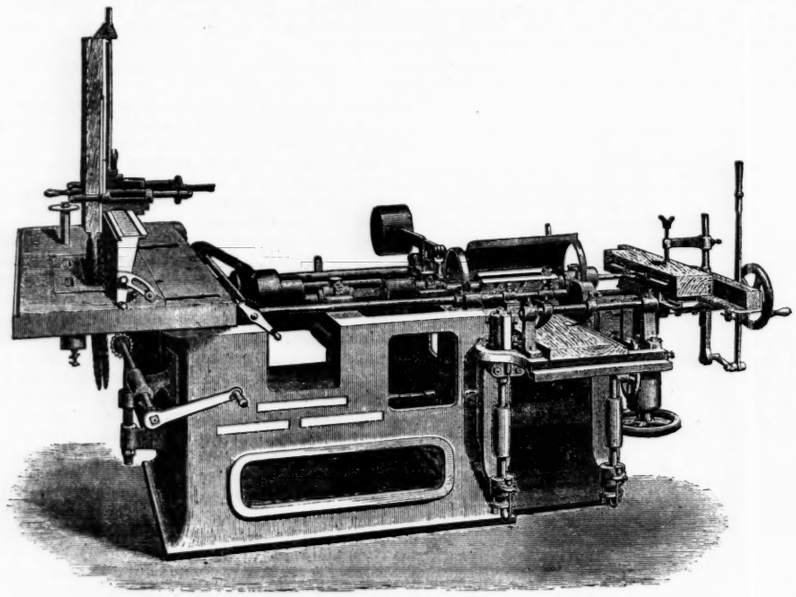


Fig. 6.

In our illustration the apparatus is set for cutting tenons, a rail being shown in position as the operation is just completed. The work is mounted vertically in a clamp, which slides on the fence. It is first brought to the two larger circular saws shown, which make the long cuts to form the sides of the tenon. The rail is then carried on, and the cheeks removed by two smaller circular saws on vertical spindles, and the shoulders are thus formed. The saws are easily removed, and cutter-blocks substituted in place of the vertical spindle saws, where any shaped moulding, straight or curved, can be executed. On the horizontal spindle of the large saws a cutter-block can be placed for doing heavier mouldings. For grooving and rebating, a drunken saw can be mounted on the same spindle. The groove cut at one operation can be varied $\frac{1}{8}$ in. up to $1\frac{1}{2}$ in. The saw is caused to rock by means of a small screw passing through it, and which presses against the face of the flange on the spindle. The fence can be arranged at any distance from the saw, or it can be set at any angle, and clamped by means of the quadrant shown, so as to cut any bevel, or it can be removed entirely if necessary. For cross-cutting, a slide is provided in order to keep the work square. This is guided by a groove in the table. The table may be made to rise and fall by means of bevel-wheel gearing worked by a screw. The handle by which this is effected is shown in front of the machine. Different speeds for moulding or sawing, &c., can be got by means of cone pulleys.

In fig. 7 we show a canting-standard band-saw machine, for cutting straight, curvilinear, bevelled, or twisted forms. The principal novelty in this consists of the manner in which the saw is canted for making a bevelled cut. In place of the table being moved to the required angle, as is usual in band-saw machines generally, the frame of the machine is moved bodily, carrying with it the saw-pulleys, so that the saw itself is set to the required angle, the table being kept stationary. The movement can be made when the machine is at work or at rest.

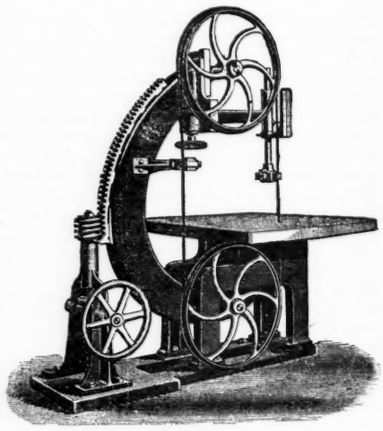


Fig. 7.

The advantage of this arrangement is that heavy work can be dealt with without the wood pressing against the saw and so causing it to break, this being a frequent cause of accident in machines of the ordinary kind. The standard is moved by means of the rack and wheel shown, and it can be canted by self-acting motion if required. The arrangement is such that the motion of the canting-standard has for its centre the point where the band-saw passes the surface of the table. This ensures the saw working at any angle through a constant centre, and the saw-guides above and below the table have not to be altered when a different bevel has to be cut. There is a simple arrangement of guide-pulleys, not shown in our illustration, for keeping the driving-belt at the same tension whatever the cant of the standard. This machine has been designed more especially for shipwrights' work. The combined rope and roller feed saw-bench, made by Messrs. Worssam, is also shown in motion on this stand. This machine we illustrate in figs. 8 and 9, which are

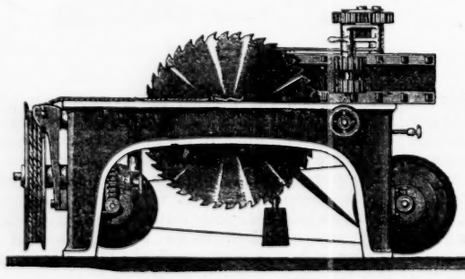


Fig. 8.

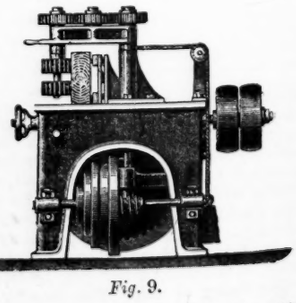


Fig. 9.

front and end views respectively. When used for heavy work, such as sawing balks or other large scantling, the rope-feed is brought into play. For deal cutting the self-acting roller motion is used. This consists of vertical fluted rollers, the spindle of which is carried in bearings in a radial arm which pivots on a standard at the back of the fence. The motion is communicated to the rollers by a train of spur-wheels on the top of the swinging arm, the driving spindle being taken through the bracket referred to. The feed-rollers are kept to the work by a weight suspended by a rope running over pulleys. The rate of feed to suit different kinds of work is varied by means of cone-pulleys. Another important machine shown on this stand is Martinier's band-saw sharpening machine. This consists of a standard having two wheels mounted horizontally, one on each side. On these the saw is stretched as it would be if required to work, the distance the wheels are apart being adjustable to suit different lengths of saw. In the centre, and supported by the standard, is a suitable frame, which carries an ordinary saw file. This is given the necessary reciprocatory motion, the same as in hand work, by means of a crank and connecting-rod. The saw is fed to the file by a cam, which works a pawl engaging the teeth of the saw. This is capable of being regulated for different sizes of teeth of saw, and it can be made to traverse two teeth at once, the files thus missing one each time.

EDINBURGH AND GLASGOW DEAN OF GUILD COURTS.

THE annual meeting of the Guildry of Edinburgh was held on the 21st ult. in the Council Chamber, Lord Provost Sir George Harrison presiding. The chairman, in accordance with the recommendation of the Council, moved the re-election of Mr. James Gowans as Lord Dean of Guild for the ensuing year. There was no doubt, he said, that Mr. Gowans had performed his duties in a most satisfactory manner. These had been, thanks to the prosperity of the city, very considerable, and it was very pleasant to know that everything he had done had been in accordance with their wishes, and they might safely say that the city had been in every respect very much the better for having so very active and so skilled a person at the head of their Guild Court.

Bailie Clark, Convener of the Public Health Committee, in seconding the motion, said that under Mr. Gowans the authority of the Dean of Guild Court had been vindicated as it had never been before, and now it was evident that the Court had authority over the erection of new buildings that it was hardly ever believed it possessed before. That had been confirmed by the Court of Session, and they were greatly indebted to the Lord Dean of Guild and the members of the guildry for obtaining this very important advance. Under the authority of the Court 223 new houses had been inspected during the past year, in addition to about five and a half miles of drains.

The motion was adopted unanimously, and Mr. Gowans, after thanking his brethren for his re-election, said that, besides what Bailie Clark had referred to, the Court had considered 594 cases, of which 137 had reference to new buildings. The more prominent new works at present were the Museum in Chambers-street, the Board School on the old Infirmary site, and the National Portrait Gallery in Queen-street. He might say that they had given particular attention to matters pertaining to the health of the city. They had considered plans with regard to sanitation, because the Court were of opinion that they could do a great deal as a body in preventing sickness and ill-health and even death itself by the attention that they gave to those matters. They had also given some attention to the architectural appearance of the buildings in Edinburgh, which they prized, too, owing to the beauty of their city, and they had attended not only to the fronts of the buildings, but also to their gables and backs, and especially to their chimneys; and he was glad to say that, on the whole, almost without a single exception, they had met with the hearty co-operation of the architects in the city.

A committee of five brethren was appointed to consider the possibility of compiling and printing a more or less complete history of the Guildry, which the Lord Dean pointed out was of older origin than their Corporation itself.

The Glasgow Dean of Guild Court met on the 22nd ult. for the first time under the presidency of the new Lord Dean of Guild, Dr. W. G. Blackie. After the Lord Dean and the liners were sworn in, the Court proceeded to elect an assessor. Dr. Marwick was proposed as sole assessor, but this office he declined to accept, and in the meantime Mr. Colin D. Donald, jun., writer, was asked to act as interim assessor until a regular appointment was made. The members of the Court are,—Dr. W. G. Blackie, Lord Dean of Guild; Mr. Wm. M'Ewen, Mr. Thomson Aikman, Mr. David Guthrie, and Mr. J. Guthrie Smith, as representing the Merchants' House; and Mr. James Sellars, architect, Deacon of the Wrights; Mr. Alex. Macara, lime merchant, Deacon of the Masons; Mr. Alex. Eadie, wright, and Mr. Robert Murdoch, mason, as representing the Trades' House.

WOODEN STRUCTURES.

MR. BANISTER FLETCHER, District Surveyor of West Newington and part of Lambeth, on Tuesday, the 27th ult., summoned Mr. P. Halahan, of No. 407, Fulham-road, at the Lambeth Police-court, for having erected a loft enclosed on four sides with wood on an existing stable building, on ground in the rear of 14, Pleasant-row, Lower Kennington-lane, Lambeth, which was not in conformity with the Metropolitan Building Act, 1855.

The defence set up was that a portion of the old stable on the ground-floor being enclosed with wood, the new loft on the first floor could not be built in brickwork as required by the Act, but the defendant was willing to enclose the building with corrugated iron; but the District Surveyor said he had no power to allow the building to be constructed in that form without the consent of the Metropolitan Board of Works had been obtained.

After examining the drawings of the building, the Magistrate (Mr. R. Biron, Q.C.) decided that the defendant must conform to the Act, as required by the District Surveyor, or make an application to the Metropolitan Board of Works for special permission to enclose the building with iron.

The defendant said he desired to make the application to the Board.

The Magistrate consented to an adjournment for one month to enable him to do this, making an order for 2*l.* 2s. costs to be paid to the District Surveyor.

QUARRIES.

SIR,—In your last issue (p. 597) the excellent paper on the above just refers to one way of collecting ancient glass, viz., by visiting the local plumbers' works.

Upon inquiry in every town "who has done the church work?" where there is an old church, I have in six years obtained more than enough ancient glass, quarries, &c., to fill a village church; that is, in Kent and Shropshire alone. If a systematic collection were made by members residing in various parts, of any of the archæological societies, much instructive material would re-appear.

With regard to the Westwell quarries, in Winston's book of plates is a painting of a quarry and border window of unusual beauty, having ruby of the best and thickest coating. A photograph of my own shows this quite perfect before the restoration of the chancel a few years ago. A visit since paid showed entire removal, I having sought the glazing in vain,—it was evidently stolen during the repairs,—my object being, as in several cases, to re-lead and re-insert the ancient glazing, nearly always removed for sickly "cathedral" glass, whatever that is.

At Little Kimble, Bucks, I lately found all the ancient quarry work well preserved, and it would repay a visit to any one in the district of Aylesbury, as well as an old quarry window in one of the inns of that town.

At Monks Risborough, Bucks, all the ancient glass had been cut about and put in one window, a practice very common, and equally ridiculous.

A few months ago a clergyman informed me that five windows in his church, which in each have effective borders of the fifteenth century complete, he would have removed, because "it was not burned in." As a matter of fact, the "enamel brown" in old examples is often badly fluxed; but more than 300 years has not caused it to peel, as in many modern windows not thirty years old.

I believe more old glass exists *in situ* at York than in any other English town,—in the parochial churches more especially. Some one resident might, if any of these edifices are to be destroyed, secure the glass at least in its entirety.

The Hackington glass, as represented, is still existing, leaded up with copied quarries of present date.

It is only by going outside and looking closely into the weather-worn appearance that the old ones can be seen; the action of time cannot be imitated by any "ancienting," so frequently practised. Either the whole surface is crooked, or little holes are seen towards the centre, not so much at the edge, of each fragment; and where the yellow stain of the fourteenth century has been applied, this has arrested in many cases the erosion entirely, which causes the pattern to seem raised. Generally speaking, an unrestored church is the best place to study old glass, however lamentable everything else is in such places. From lack of such study many glass-painters are now making copies of ill-copied modern work, all feeling being utterly lost.

Not unfrequently we see bad fifteenth-century detail in glass inserted into very severe copies in stone, of First Pointed character: this is remarkable just round London more especially.

The early restorers copied the detail fairly well, but having only bad and thin glass to paint upon, the effect is nearly always in all cases found to be weak, particularly the works of the late Mr. Williment. F. G.

AUTOMATIC COUPLINGS.

SIR,—In your "Notes" of last week (p. 595) you refer to "the very practical recommendation in regard to the important question of automatic or improved coupling appliances on railways," made by the Amalgamated Society of Railway Servants, that, to my knowledge, has been repeatedly made by this Society. Several years since an exhibition of such appliances took place at Leeds, at the Society's instigation, — prizes and certificates were awarded, but nothing came of it in this country. The Colonial Railway authorities, however, are not so apathetic. The New South Wales Railway Department have adopted one of the "patent couplers" exhibited and certificated at Leeds, viz.:—Messrs. Thomas & Cowdery's,—and are gradually applying it to their plant. They have also applied for space, in the forthcoming International and Colonial Exhibition, in order to show it attached to trucks of full size and in working condition. It is said that the railway servants in the mother country are lukewarm in regard to pushing the adoption of automatic couplings, as these would, in all probability, reduce the number of *employés* now required, but for the truth of this allegation I will not vouch. METER.

LA MONNAIE, PARIS.

SIR,—I see in your last issue [p. 596] you draw attention to what has been recently done to this building. When I was in Paris about three years ago, they were cutting off the Imperial N and crown, and recutting R. F. in its place. If they are going to do the same to all the buildings in Paris and elsewhere, there will be a grand confusion of dates for the next generation of antiquaries.

A. OLIVER.

*** We have received an important letter from Dr. John Brown in regard to the circular ward question, with special reference to the new Burnley Hospital, which we are obliged to defer to next week, for want of space.

Builders' Benevolent Institution.—The thirty-eighth annual dinner in aid of the funds of this Institution was held on Thursday evening last, in the Hall of the Worshipful Company of Carpenters, London Wall. Mr. Arthur C. Lucas, J.P., President of the Institution, occupied the chair, and covers were laid for about 170 persons. During the evening the Secretary, Major Brutton, announced subscriptions and donations to the amount of 1,000*l.* A report of the proceedings will appear in our next.

Royal Institution of Great Britain.—At the general monthly meeting, held on Monday last, Mr. Warren de la Rue, F.R.S., Manager and Vice-President, in the chair, Mr. Joseph Wilson Swan, Mrs. J. W. Swan, and General J. F. Tennant, R.E., F.R.S., were elected members.

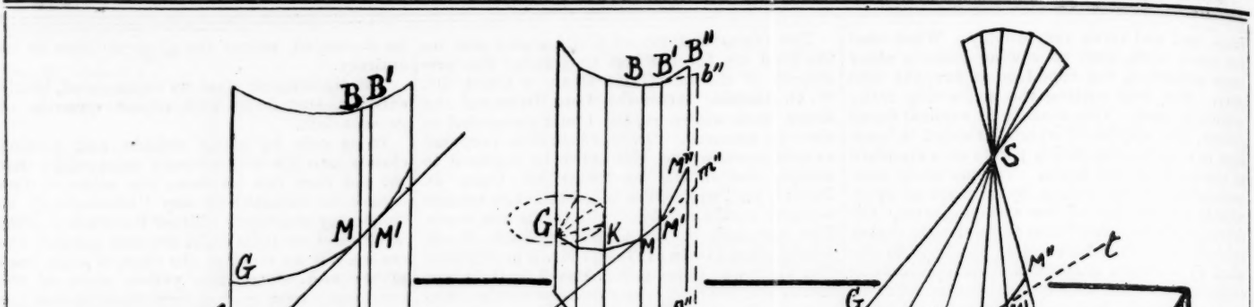


Fig. 193. *Fig.* 194. *Fig.* 195.

The Student's Column.

DESCRIPTIVE GEOMETRY.—Part II.

XXIII.

Properties and Characteristics of Developable Surfaces.

IT is one of the principal objects of our science to study the properties of the surfaces and the lines which compose the essential parts of all structures, so as to be able to use them with discernment in making our designs. In the classification which we gave at the beginning of the second part of these papers (see June 6, 1885), we briefly described what were developable surfaces, and we studied afterwards the cone and the cylinder, which are the most commonly known of developable surfaces. We avoided investigating the general properties of these surfaces, because we were afraid that the subject would then seem too abstruse for our readers. But, these studies cannot be omitted, for they are of no slender practical importance; and, we think, those who have had the patience and industry to follow us up to this point will now very easily comprehend the reasonings by which we establish the properties of developable surfaces in general.

The mathematical definition of a developable surface is *a surface* (flexible like paper, but not extensible like Indiarubber) *which can be laid down on a plane without changing its superficial area.* We have seen that a cylinder is such a surface, but we feel without a proof that a sphere is not.

We have seen (fig. 86) that the tangent to a curve can be considered as a straight line passing through two points of the curve *infinitely close to one another*, or a line which has *one element in common* with the curve. In other words, we may consider a curve as a polygon, the sides of which are infinitely small, and we may consider the tangent to the curve as one of those sides prolonged. Therefore, whatever is true of a polygon, independently of the size or number of its sides, will be true also of a curve.

We have also shown (fig. 91) that, in a surface, the divers curves drawn through a given point have their tangents all contained in one plane, which we have called the *tangent plane.* As every tangent contains an element of a curve, so we can consider that the tangent plane contains an infinitely small element of the surface to which it is tangent. In general, that element is infinitely small in all directions, but with cylinders it is a strip infinitely narrow, but also infinitely long, or, speaking less mathematically, as long as the cylinder itself. We have delineated, in fig. 193, the plane B A T tangent to a cylinder, and the elementary strip of the cylinder's surface it comprises.

To follow exactly what occurs when developing a cylinder, we have only to examine what occurs in developing a prism, as in fig. 194. If we want to know what becomes of a curve such as G M M^1 (fig. 193), when the cylinder has been developed, we have only to consider what becomes of the polygon G K M M^1 M^{11} (fig. 194) when the prism has been developed. When we turn the face A^1 A^{11} B^1 B^{11} of the prism round its arris A^1 B^1 until it stand in the same plane as the neighbouring face AA^1 BB^1, the side M^1M^{11} of the polygon will have come to M^1m^{11}. Now M^1m^{11} forms the same angle with the vertical arris A^1 B^1 as the side M^1 M^{11} did before the rotation, and we can conclude that, in developing the cylinder (fig. 193), the curve G M M^1 becomes a *transformed curve*, the tangents to which form the same angle with the generators as the tangents to the original curve did with the same generators of the cylinder before being developed. It is on this property we based our method of drawing the tangent in any point of the transformed curve in figs. 109 and 111. By examining figs. 193 and 194 we get also the two following conclusions:—

The transformed curve is *exactly of the same length* as the original one.

In right cylinders the portions of the generators MA, M^1A^1, . . . comprised between the curve and the base remain in the developed cylinder equal to what they were before, and they are perpendicular to the transformed base which becomes a straight line.

With the exception of the base of a right cylinder, a curve drawn on the surface of a cylinder is transformed in another curve when developed, but there are certain cases in which it is transferred in a straight line. This occurs when (fig. 194) the element M^1 M^{11} of the curve forms the same angle, with the generator A^1 B^1 as the element M M^1 does with the generator A B; in other words, when *all the tangents to the curve form a constant angle with the generators.* Such a curve is called a *helix;* that is, the thread of a screw.

From what we have said, we can see that a helix is the shortest line that can be drawn between two points on the surface of a cylinder, for in the developed cylinder it is transformed in a straight line, which is, of course, shorter than any curve according to which other lines are transformed.

We beg to observe also that a helix is always a *skew curve*, what we have called until now a curve of double curvature; this means a curve of which three *consecutive elements*, although they may be infinitely small, *are not contained in the same plane.* This we can see by fig. 194. Suppose that through a point G we produced three lines parallel to the elements KM, MM^1, M^1M^{11}; if these elements belong to a helix, they all form the same angle with the generators, and, therefore, their parallels through G would belong to a cone of revolution. Three generators of a cone of revolution cannot be in the same plane, so it is evident that the three elements KM, MM^1, M^1M^{11} are not in the same plane.

There is but one case which forms an exception to the above law,—this is when the elements of the curve form right angles with the generators, then they are contained in one plane. This is the curve which we have called the base of a right cylinder, or the *orthagonal section* of a cylinder, and now we know that no other plane section but the orthagonal can be transformed in a straight line on the developed cylinder.

In fig. 194 we can see that in a *skew curve* two successive elements, such as KM, MM^1, or MM^1 M^1M^{11} are always contained in a plane. The plane MM^1M^{11}, for instance, is called the *osculating* (kissing) *plane* of the curve in the point M. For the point K the osculating plane would be KMM^1, and so on, so that the different osculating planes cut one another along an intermediate element of the curve such as MM^1. All this is equivalent to saying that *the osculating plane is the plane which passes through two tangents in points of the curve infinitely close.*

The osculating plane must not be confounded with the tangent plane, which contains only one tangent to the curve, and is the plane tangent to the cylinder itself.

Observe also that any curve can have only one tangent in a point thereof, but it can have an infinite number of normals or lines perpendicular to the tangent through the point of contact. The normals are, of course, contained in a plane which is perpendicular to the tangent. This is the *normal plane* to the curve in a given point thereof.

The above is the reverse of what we have seen for a surface. This admits of an infinite number of tangents in a given point, all contained in the tangent plane; but, on the other hand, there is but one normal in a point of a surface.

We have also, in fig. 195, analysed a portion of a cone by considering it as pyramid, with the following results.

All conical surfaces are developable, and in this transformation the generators or any portion thereof keep their primitive lengths.

Any curve drawn on the surface of the cone becomes a line, which we call the *transformed curve*, different from the original one. The length of the transformed curve is equal to the length of the primitive curve.

Each tangent to the original curve forms with the generator of the cone an angle which changes not when the cone is developed, and is, therefore, *tangent also to the transformed curve.*

A curve of the cone may be transformed into a straight line when the curve is developed. This occurs when (fig. 195) *two consecutive elements of the curve*, such as MM^1, M^1 M^{11}, *form equal angles with the intermediary generators;* we mean when angle S M^1 M^{11} = S M^1 *t*.

A curve, such as the above, will be, of course, the shortest line between two points on the surface of a cone, but it will not be a spiral rising up to the vertex of the cone. In fig. 195 we see that the angle S M^1 *t* is necessarily larger than the angle S M M^1; therefore, we find that the curve begins by forming an acute angle with the generators, and that the angle gets larger and larger as we go up. When the angle will be a right angle, the curve will have attained its greatest height and will then go down again. It will be found that the shortest line from one point to another of a parallel of a cone of revolution is not the arc of the parallel, but a certain hyperbola.

A curve which on a cone forms (similarly to the helix on the cylinder) *a constant angle with every generator is a spiral.* This spiral would approach indefinitely the apex of the cone without ever reaching it; and, in the developed cone, it is transformed in the logarithmic spiral, —that is, a spiral which cuts all rays from its centre under the same angle.

The Albert Palace.—We are informed that the Art Committee of the Albert Palace are arranging for two exhibitions, consisting respectively of oil and water-colour views of old London and its environs and portraits of theatrical celebrities of the seventeenth and eighteenth centuries.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

10,835, Drain Scraper. G. Gowing.

A crescent-shaped scraper springs up against the handle when the latter is introduced into a drain, and stands out at right angles when withdrawn. The handle may be coupled up in lengths.

12,965, Water-waste Preventer. W. Vivian.

The outlet-pipe projects into the flushing-tank, and is covered by a bell, which has an internal flange at the bottom. Siphonic action is started by forcing the water over the crown by pulling the bell up.

13,691, Disinfecting Water-closets. G. Nobes.

The tank to contain the disinfectant is placed in a suitable position, and connected to the closet-pan by a pipe in which is an inverted T-piece. The pipe is intercepted by a conical plug, connected by a spindle to the cap which slides down the T-piece by its own weight, and closes the valve. The valve is controlled by the same handle as that which opens the flushing-valve.

13,817, Siphon Water-waste Preventer. F. Turner.

A siphon is formed of the shell at the end of the tank, and is started by a discharge of water into a long leg obtained by raising the valve. When the discharge-pipe is very long, it is provided with an air-inlet at a short distance below the cistern.

13,867, Paints made from Bitumen. A. J. Boult.

Mineral bitumen is utilised in the manufacture of preservative and other paints. A black paint is made by boiling a hundredweight of bitumen, adding a gallon of linseed oil, and mixing after cooling with five gallons of turpentine; the mixture is then ground in the usual manner. A damp-proof paint for ironwork is obtained by the addition of resin, red lead, and litharge, or other suitable colouring matter to the above.

13,095, Sanitary Houses and Bungalows. W. Brock.

The houses are built in the style of a bungalow, slate being the chief material employed. A platform or floor composed of slabs of slate is laid upon a number of vertical pillars, and upon it are erected the walls of the building, and the pillars for the verandahs. The walls also are built of slate slabs of which the edges rest in grooves, and are retained by skirtings screwed in place. Mouldings above similarly secure the slabs at the tops of the walls, while others placed vertically divide the walls into panels. The ceilings are of wood or thin slate. For temperate climates the walls are single, but in either hot or cold climates they are double. In the first case a cooling current of air is induced between the walls, and in the second the air is confined in order to utilise it as a non-conductor. Timber is as little used as possible, iron being preferably used. In hot countries, a perforated pipe connected with water-tanks on the roof may run round under the eaves, from which at will a cooling shower may be thrown against the walls. Under the building are wagons in which the sewage is received, and which are successively removed at intervals.

NEW APPLICATIONS FOR PATENTS.

Oct. 23.—12,687, J. Brindle, Laying, Jointing, Fixing, and Removing Pipes, &c.—12,700, J. Westmoreland, Ventilation and Construction of Buildings.—12,704, H. Marle, Set Squares.—12,706, J. Green and Others, Kitchen or Room Fire-grates.—12,708, C. Barnard, Metallic Handles for Gimlets, Awls, &c.—12,716, R. Brough, Ventilators.—12,725, H. Blythe, Bricks for avoiding Side and End Straight Joints.—12,737, E. Horsley, Window and Door Fasteners.

Oct. 24.—12,754, G. Newman, Floor Springs for Swing Doors.—12,762, J. Belfield, Furnace for Bricks, Tiles, &c.

Oct. 26.—12,801, S. Bamford, Stench Traps.—12,805, W. Green, Securing Knobs to Spindles.—12,811, D. Grove, Improvements in Shower-baths.—12,814, J. Wilson, Improved Process of Preparing Fire-clay for Potter's use.—12,832, B. Skipworth, Self-acting Window-fastener.—12,839, G. Wickham, Flushing Cisterns and Water-waste Preventers.—12,844, W. Lake, Preservative Fluid for Woods.

Oct. 27.—12,858, T. Robinson, Cutter-blocks and Cutters for Wood-working Machinery.—12,868, A. Barr, Improvements in Stair Railings.—12,884, C. Elliott, Tops for Chimneys, Ventilators, &c.—12,903, W. Lake, Improvements in Doors, and in Hanging and Closing same.—12,908, S. Pitt, Manufacture of Lime, Cement, Mortars, Hydraulic Concretes, and Artificial Stone.—12,920, C. Howe, Manufacture of Keene's Cement.—12,926, A. Boult, Door-Checks.—12,929, F. Dickinson, Paint-Brushes, &c.

Oct. 28.—12,938, J. Adams, Water-closet Pans.—12,957, J. Sheldon, Improvements in Wood and other Screws.—12,969, W. White, Improvements in Ball, Float, and other Valves and Taps.—12,974, J. Cotsworth, Improved Sash-fastener.

Oct. 29.—12,991, W. Kinsman, Sanitary Joint for all kinds of Pipes.—13,039, G. Wishart, Ventilating and Chimney Cowls.—13,043, C. Cresswell, Improvements in Stoves or Firegrates.—13,045, E. Edwards, Improved Folding Ladder.

PROVISIONAL SPECIFICATIONS ACCEPTED.

9,443, W. Fryer, Spring for Closing Doors, &c.—9,499, F. Beaumont, Improved Protractor.—10,905, C. Fellows, Sustaining Window-sashes and Shutters without the aid of Sash-weights.—10,988, W. Wright, Mounting, Balancing, and Securing Window-sashes.—11,149, W. Lea and J. Beech, Sash-fasteners.—11,229, P. Smith, Colouring, Painting, or Bronzing Letters and Figures in Relief.—11,684, W. Jones, Drying Bricks, Terra-cotta, &c.—12,098, W. Bruce, Drain Bends and Branches, with Traps combined.—12,118, G. Garrard, Machinery and Apparatus for the Manufacture of Tiles.—12,138 and 12,139, A. Williams, Improved Construction of Dust-bin.—12,252, A. Drummond, Improvements in Glazing.—11,046, H. Turner, Door and Gate Fastenings.—11,334, E. Sloan, Improved Window Fastener.—11,387, J. Colbran, Cooking-ranges.—11,530, W. Gill, Improved Push and Pull Action for Door Locks and Latches.—11,762, E. Hatton, Improvements in Ventilators.—11,829, W. McGinnis, Screw-threaded Nail.—11,843, R. Baillie and L. Chapman, Planing Machines.—11,974, C. Jackson, Floor Coverings and Stair-treads.—12,295, H. Buchan, Water-closet Basins.—12,328, R. Lee, Construction of Fireproof Pillars and Columns.—12,405, J. Allen, Machinery for the Manufacture of Bricks and Tiles from Plastic Materials.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

15,441, T. Bear and H. Ransom. Combination Circular Saw, Fret Saw, and Drill.—840, W. Lake, Steam-heating Apparatus for Warming Houses, &c.—2,349, A. Clark, Combination Truck and Ladder.—5,798, G. Crowther, Receptacle for Paints, Stains, and Brushes.—7,587, W. Farrow, Waste-water Preventer Cistern for Water-closets.—10,668, H. Moody and J. Pope, Construction of Roofs or Coverings for Houses, &c.—16,523, R. Holmes, Fire-grates.—16,602, G. Jennings and Others, Indicating Apparatus for Electric Bells, &c.—16,754, A. King, Indicator for Water-closet and other Doors.—1,173, W. Gillett and H. Moreton, Ventilating Apparatus.—3,493, J. Anderson, Automatic Saw Setting and Sharpening Machines.—4,643, G. Ellis, Portable Dry-earth or Carbon Closet.—9,244, A. Boult, Machine Tools for Stone-working.—11,610, G. Redfern, Apparatus for Preventing Concussion in Water-pipes.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

OCT. 21.

By FAREBROTHER, ELLIS, CLARK, & Co.

Scotland, Redcastle, near—"Bridgend Farm," about 41 acres £3,000

OCT. 22.

By CHINNOCK, GALSWORTHY, & Co.

Horndean, Hants—"Blendworth Lodge" and 51a. 2r. 34p., freehold 9,000
"Hook Cottage" and 4a. 0r. 33p., freehold 1,800
Enclosures of land, 17a. 1r. 25p., in lots 1,805
"Myrtle Farm," containing 138a. 3r. 28p., freehold 4,900

OCT. 26.

By HINCH & LEWIS.

Hackney—165, 169, 171, and 177, Clarence-road, 90 years, ground-rent 27*l.* 1,850

By S. ROBINSON.

Hackney—A Profit Rental of 10*l.*, term 11 years ... 35

OCT. 27.

By C. & H. WHITE.

Pimlico—23, Bessborough-gardens, 42 years, ground-rent 11*l.* 8s. 700

By E. & H. LUMLEY.

Sydenham—Freehold ground-rent, 50*l.* a year, reversion in 75 years 1,000

By A. RICHARDS.

Edmonton—5 to 8, Elm-cottages, 87 years, ground-rent 7*l.* 16s. 270
Stamford Hill—53, Russell-road, 91 years, ground-rent 7*l.* 7s. 150

By F. J. BISLEY.

Borough—16 to 20, Queen's-court, freehold 1,245
Rotherhithe—31, Prince's-street, freehold 365

By DEBENHAM, TEWSON, & Co.

City—4, Upper Thames-street, 67 years, ground-rent 200*l.* 600
Old Ford-road—"The City of Paris" public-house, freehold 2,850
No. 28, Mace-street, freehold 600

By ROBINSON & FISHER.

Gordon-square—No. 37, 57 years, ground-rent 33*l.* 10s. 1,500
Two Policies for 500*l.* each and Bonuses, Life, aged 59 years 820
Drury-lane Theatre—A Renter's Share 80
Devon, near Dartmouth—"Dallacombe Farm," 52a. 0r. 19p., freehold 3,000
"Bowbridge Farm," 29a. 2r. 4p., freehold 1,350
Freehold Meadow Land, 1a. 2r. 1p. 155
Freehold Orchard Land, 2a. 1r. 12p. 325
Freehold Cottages and Land, 6a. 1r. 39p. 480
Freehold Water Corn-mill and Cottages 680
Numerous Cottages and Land, freehold 961

OCT. 27.

By SEDGWICK, SON, & WEALL.

Watford—92, High-street, freehold 420
No. 83, High-street, freehold 510
Rickmansworth—Freehold house, cottage, and outbuildings 950

OCT. 28.

By GILLOW & Co.

Bayswater—31, Porchester-terrace, 40 years, ground-rent 15*l.* 9,000

By THURGOOD & MARTIN.

Leicester-square—6, St. Martin's-street, freehold... £1,300

By BAKER & WILKINSON.

Cavendish-square—The lease of 16A, Old Cavendish-street, 7¼ years 550

By A. WALTON.

South Lambeth—10, St. George's-terrace, 75 years, ground-rent 7*l.* 5s. 500

OCT. 29.

By A. STEARN.

East Ham—1 to 6, Talbot-terrace, freehold 305

By A. BOOTH.

Camden-road—8, Middleton-road, 61 years, ground-rent 2*l.* 10s. 660
Islington—493, Liverpool-road, freehold 560

By J. G. & A. PREVOST.

Mile End—52 to 58, even, Sandy-street, freehold ... 885
45, Tollit-street, 38 years, ground-rent 2*l.* 15s. 280
Limehouse—41 and 43, North-street, freehold 350

By E. STIMSON.

Brixton—26 and 28, St. James's-road, 33 years, ground-rent 12*l.* 12s. 525
1 to 8, Effra-terrace, 5, Effra-parade, and 115, Dalberg-road, 11 years, ground-rent 16*l.* 1,150
54 and 56, Vassall-road, 14 years, ground-rent 27*l.* 6s. 310
Peckham—266 and 268, Commercial-road, 24 years, ground-rent 5*l.* 10s. 300
Wandsworth—310, Wandsworth-road, 12 years, ground-rent 4*l.* 160
Clapham—135, Grant-road, freehold 300
Pimlico—33, Sutherland-street, 48 years, ground-rent 8*l.* 8s. 600
King's Cross—14, Acton-street, 68 years, ground-rent 8*l.* 500

By NEWBON & HARDING.

Hoxton-square—No. 6, freehold 1,625
Clerkenwell—113, St. John-street-road, 25 years, ground-rent 6*l.* 500
Islington—21, Baxter-road, 74 years, ground-rent 5*l.* 5s. 325
18 and 19, Albert-terrace, 62 years, ground-rent 4*l.* 855
Barnsbury—104, Hemingford-road, 56 years, ground-rent 10*l.* 725
An improved rental of 15*l.* 13s. a year, term 59 years 350
Pentonville—24, Amwell-street, 21 years, ground-rent 10*l.* 10s. 450
Hackney—Ground-rents of 14*l.* a year, reversion in 66 years 355
Upper Holloway—Ground-rents of 18*l.* a year, reversion in 78 years 440
29, Campbell-road, 79 years, ground-rent 5*l.* 145

OCT. 30.

By GREEN & SON.

Southwark—Ground-rents of 150*l.*, reversion in 94 years 3,680

By DRIVER & Co.

Lincolnshire—The Manor of Crowland, with its rights, &c. 13,650

By BAKER & SONS.

West Kensington—Freehold land, 7a. 0r. 9p..... 14,000
Brompton-road—No. 172, freehold business premises 3,350
Bloomsbury—42, Devonshire-street, freehold..... 1,140
Kensal Green, Harrow-road—"The Tavistock Farm Dairy," freehold 560
"Tavistock Villa" and "Kensal Lodge," freehold 2,380
"The Manor House," "Manor House Lodge," and 3a. 1r. 28p. 3,000
Three plots of freehold land 1,720

MEETINGS.

SATURDAY, NOVEMBER 7.

British Museum (Archaic Room).—Miss J. E. Harrison on "The Parthenon Marbles." (I.) 11 a.m.

Association of Public Sanitary Inspectors.—Mr. G. B. Jerram, Chairman of the Council, will deliver his Annual Address. 6·0 p.m.

MONDAY, NOVEMBER 9.

Surveyors' Institution.—Address by the President, Mr. E. I'Anson. 8 p.m.

Leeds and Yorkshire Architectural Society.—Mr. James Holroyd on "The Artistic Treatment of Ceramics in Relation to Architecture and Decoration."

Inventors' Institute.—8 p.m.

TUESDAY, NOVEMBER 10.

Institution of Civil Engineers.—Discussion on Professor Osborne Reynolds's Paper on "Indicator Diagrams." (2) Discussion on Mr. A. W. Brightmore's Paper on "The Steam Engine Indicator." 8 p.m.

Manchester Architectural Association.—Conversazione, 7·30 to 10. p.m.

Anthropological Institute. 8 p.m.

WEDNESDAY, NOVEMBER 11.

South Kensington Museum (Lecture Theatre).—Miss J. E. Harrison on "The Mythology of the Iliad as illustrated by Greek Vase Paintings." (II.) 5·15 p.m.

Liverpool Engineering Society.—Mr. Thomas Duncanson on "Service Reservoirs." 8 p.m.

THURSDAY, NOVEMBER 12.

St. Paul's Ecclesiological Society.—Mr. W. H. St. John Hope on "Mediæval Chalices and Patens." 7·30 p.m.

Society of Telegraph-Engineers and Electricians.—Major-General Webber, R.E., on "The Telegraphs of the Nile Expedition." 8 p.m.

Bramley.—On Saturday night last the workmen engaged on a new house at Bramley, Surrey (which has been built by Mr. J. Bottrill, of Reading, for Captain Webster, of Bramley), were invited to a supper provided for them by Captain Webster. A very enjoyable evening was spent, and after supper a handsome testimonial was presented to Mr. Jenkins, the manager, from Captain Webster, in recognition of the satisfactory way in which he has carried out the work. The testimonial consisted of a handsome jug and two cups in oak and silver, with inscriptions.

Miscellanea.

Tidal Approaches and Deep-Water Entrances.—At a meeting of the Society of Engineers, held on Monday evening last at the Town-hall, Caxton-street, Westminster, Mr. Charles Gandon, President, in the chair, a paper was read on "Tidal Approaches and Deep-Water Entrances," by Mr. J. B. Redman, M. Inst. C.E. The author described the altered conditions due to the rapid increase of late years in the size of oceanic steamers and the transition of freightage and passenger traffic, from the 1,200-ton Indiaman to the 5,000-ton steamer, and noted the demand for increased deep-water depôts due thereto. The peculiarity of British tides was explained, and the great advantages they secured to this country. The character of various deep-water sites was analysed, and a comparison drawn between the London and Liverpool estuaries. The navigable properties of the Thames reaches were described, and the difficulties of docking ships on a tide-way referred to. A review was given of the rise, progress, and schemes for extension, of our metropolitan docks. The new Tilbury Docks, now approaching completion, were considered, especially as regards the approaches from seaward. The advantages of the Thames Haven and Shell Haven sites were pointed out, as the most seaward positions that could be obtained for metropolitan docks. The modern improvements in dredging plant were referred to, as showing the direction in which we must look for artificial aid in opening out our "Tidal Approaches," and the paper concluded with a brief notice of the various methods of deep water foundations by cylinders, caissons, cribwork, concrete in blocks, *pierre perdue*, squared blocks, *en masse*, or by bags and skips, by monolithic hollow blocks, or the section of quay or wall entire, and pointed out how largely these various methods would be extended and developed in the future for "deep-water entrances."

The Central Criminal Court.—The complaint of a witness that the accommodation at the Old Bailey for those giving evidence is disgraceful was fully endorsed by the remarks of the presiding judge. Owing to the governing authorities of the City being distinct and separate from those governing the rest of the metropolis, this disgrace has to be tolerated. The City would naturally object to devoting its funds to the reconstruction of courts which are not limited in their use to the hearing of City cases, and until it and the rest of London have a common fund and a common governing body, the difficulty is likely to remain. Were health merely concerned we should not expect much attention to be paid to the matter, but the interference to comfort and to the performance of the duties of the court is sufficient to make Londoners, who have no special knowledge of parochial boundaries, find but little consolation in the fact that such sacrifices must be made for the maintenance of civic institutions. London, indeed, is learning by degrees the inconveniences attending a divided government.—*Lancet*.

Paved Channels in Town Roadways.—Mr. J. M. Knight, Surveyor to the Vestry of Mile End, points out that, in the present days of steam road rolling, it is necessary to have all channels paved, if for no other reason than to prevent the curb from being disturbed every time the road is repaired. Channel-paving prevents small pools of stagnant water, which with the best roadmaking will always occur in macadamised roads, owing to the softness of the subsoil, which is caused by the openings for gas and water supplies. In these small pools the low forms of life germinate, and, when dry, are blown over the locality. It may be that no disease germ is incubated in these small deposits of decaying matter once in a thousand cases; but anything which produces objectionable smells at all times affects the health of the inhabitants, and by so doing may render them susceptible to disease.—*Metropolitan*.

Sewerage Scheme for Rishton.—The Rishton Local Board have authorised their surveyor (Mr. Helm, of Accrington) to prepare plans for the carrying out of a sewerage scheme for Rishton, which, it is estimated, will involve an outlay of about 5,000*l*.

Town-hall, Edmonton.—In our brief description of the new Town-hall at Edmonton last week, it should have been mentioned that the lightning conductors were supplied by Messrs. R. S. Newall & Co., of 130, Strand, W.C.

Friction and Lubricants.—The usual fortnightly meeting of the Liverpool Engineering Society was held on Wednesday, the 28th ult., at the Royal Institution, Colquitt-street, Mr. W. E. Mills, President, in the chair. A paper by Professor Hele-Shaw (University College, Liverpool), entitled "Recent Researches on the Nature of Friction and the Action of Lubricants," was read by the author. The author in the first place briefly reviewed the steps which had been made in the progress of our knowledge of friction, and pointed out that General Morin's results and conclusions, both on the sliding and rolling contact of surfaces, published between 1830 and 1834, had until recent years been regarded as final. During the last ten years, however, many scientific men had worked at the subject, and much light had been thrown not only on the sliding and rolling friction of solids, but on the friction of liquids and gases. The author in the present paper confined his remarks entirely to the sliding contact of dry and lubricated surfaces of solids. Commencing with the friction of dry surfaces, it has for some time been admitted that the so-called laws of friction usually given in text-books are probably never exactly true under ordinary pressures and velocities, while they lead to very erroneous conclusions if applied beyond moderate limits, and the experiments of Ball, Douglas Galton and Westinghouse, Fleming, Jenkin and Ewing, Poirée, and others were alluded to in proof of this. In discussing the actual nature of friction of dry surfaces the author believed that more careful and elaborate observations of temperature at extreme velocities and pressure was needed. Coming to the subject of the contact of lubricated surfaces, a far greater advance had been made. The work of Thurston and the experiments made by the committee of the Institution of Mechanical Engineers were of great value, and the main results were brought forward. A striking feature in the progress of the subject was the increasing use of testing machines, and those of Thurston, Stapper, and Bailey were exhibited and described.

Archæologists at St. Albans.—Last week some members of an archæological society, in connextion with the "Leland Club," visited St. Albans. They first proceeded to St. Michael's Church. Mr. Patrick, who read a short paper, said the church was interesting on account of its great age and peculiar features. The oldest part was the early Norman nave, built fifty years or so before the Conquest. The church was peculiar in its construction. There was a particularly interesting old monument outside, built into the south wall of the chancel, which was once inside the church. About 1804 the edifice was restored, and a great many old monuments were destroyed, and the one in question was removed to its present position. There was an interesting old painting of the Resurrection to be seen. The churches about the neighbourhood of St. Albans were built of the ruins of the city of Verulam, and in the tower of that church there were to be seen courses of Roman tiles used. There was very little of historical interest connected with the church. The party then proceeded, some in carriages and some on foot, along Watling-street to the gate at the top of Verulam Woods, from whence they walked through the woods, inspecting the ruins of the Roman walls, and the remains of the fosse, to the causeway, and thence across the silk-mill bridge. Here Mr. Winston made a few remarks on the old city of Verulam. Rejoining the carriages, the party proceeded to the George Hotel to lunch, after which the Abbey church was visited. In the presbytery, Mr. Patrick read a paper detailing the history of the church. A vote of thanks was given to Mr. Patrick, on the motion of Mr. Wright, F.S.A., seconded by Mr. Reynolds, on behalf of the Bristol contingent of the party. The archæologists then walked through the church under the leadership of Mr. Patrick, who pointed out its principal features. The exterior of the building was subsequently viewed. The remainder of the day was spent in visiting the remains of Sir Richard Lee's Manor House, built on the site of Sopwell Priory.

The Hotel Metropole.—Messrs. R. F. Dale & Co., of Bear-lane, Southwark, have fitted the windows of the Hôtel Métropole with Holland's "Lazy" ventilator, the patent of which they have purchased. This ventilator was described in the *Builder* for Dec. 1, 1883, p. 737.

Institution of Civil Engineers.—The sixty-ninth session of the Institution of Civil Engineers will be opened on Tuesday, the 10th of November, when the first business will be the formal presentation, by the President, of the premiums and prizes awarded for papers submitted last session; after which a discussion will be taken on the steam-engine indicator, and on errors in indicator diagrams.

The Holborn Restaurant.—The new grill-room, just finished, at the Holborn Restaurant, is to be opened to the public this Saturday, November 7th. It forms the principal portion of the ground-floor of the new building fronting Little Queen-street, of which we gave a view in the *Builder* for January 31st last. The new grill-room will supersede the existing grill-room, which it is the intention to utilise as a reading-room. The new grill-room is a large and lofty apartment, and is very richly-decorated. The dado is in Grand Antique marble of the Pyrenees, with moulded black marble capping. The pilasters round the room are of Rouge Incarnat. The general wall-lining is of Campan Vert, with panels of Venetian enamel mosaic; the frieze is of Siena marble, with Campan Vert cornice. The ceiling is panelled with alabaster from Derbyshire, having centres of Venetian enamel mosaic; the four iron columns in the centre are encased with Vein marble, reeded and fluted, with gilt caps and bases. The cove round the room is of fibrous plaster, gilded, from the festoons of which incandescent electric lights project; the floor is of marble mosaic. The corridors in the upper part of the new wing have marble dados all round them, and the floors of these, as well as the new rooms, are marble mosaic. In the floors of the top corridors of all Hyatt's lights are effectively introduced in combination with panels of marble mosaic. All the mosaic and all the marble work have been carried out by Messrs. Burke & Co., of Newman-street. The architects for the work are Messrs. Archer & Green. It may be of interest to state that, including the buildings now completed, accommodation is provided for 2,000 persons to dine at once. Ultimately the buildings will be extended to the corner of Little Queen-street.

Ventilation.—Messrs. Robert Boyle & Son are at present applying their complete system of ventilation for ships to the two large new Transatlantic steamships *Champagne* and *Bretagne*, belonging to the Compagnie Générale Transatlantique, and also to the two new Transatlantic steamships *Gascogne* and *Bourgogne*, at present being built for the Société Anonyme, Marseilles. There will be fitted on these vessels ninety-six Boyle's patent air-pump ventilators of the largest sizes, and twenty-eight Boyle's patent downcast ventilators, also of the largest sizes. These companies have already used and approved of Messrs. Boyle's system, which is now generally used by all the leading steamship companies, and is also adopted in the British and foreign navies.

Lifts.—The American Elevator Company have just closed a contract for two of their Standard Hydraulic Elevators, one for passenger and one for goods use, to be erected in the Hôtel Bristol, in Paris. This hotel is well known to Englishmen as the head-quarters of H.R.H. the Prince of Wales when in Paris. It was intended to have had these lifts running for the use of H.R.H. during his recent stay there, but circumstances prevented.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	6	10	0	7	10	0
Teak, E.I. ....load	12	10	0	15	10	0
Sequoia, U.S. ....ft. cube	0	2	6	0	2	9
Ash, Canada ....load	3	0	0	5	0	0
Birch ,, ...	3	0	0	4	10	0
Elm ,, ...	3	10	0	5	0	0
Fir, Dantsic, &c.	1	12	0	4	10	0
Oak ,, ...	3	0	0	5	0	0
Canada	6	0	0	7	0	0
Pine ,, red	3	0	0	4	0	0
,, yellow	3	15	0	5	5	0
Lath, Dantsic ....fathom	5	0	0	6	0	0
St. Petersburg	5	0	0	7	0	0
Wainscot, Riga....log	3	0	0	4	10	0
Deals, Finland, 2nd and 1st...std. 100	8	0	0	9	0	0
,, 4th and 3rd	6	10	0	7	10	0
Riga	7	0	0	8	10	0
St. Petersburg, 1st yel.	10	0	0	17	0	0
,, 2nd ,, ...	8	0	0	9	15	0
,, white	6	10	0	11	0	0
Swedish....	7	0	0	17	0	0
White Sea	8	10	0	19	0	0
Canada, Pine 1st	18	0	0	32	10	0
,, 2nd	12	0	0	18	10	0
,, 3rd, &c.	7	0	0	10	10	0
,, Spruce 1st	9	0	0	12	0	0
,, 3rd and 2nd	6	10	0	7	10	0
New Brunswick, &c....	5	0	0			
Battens, all kinds	4	0	0	13		

TIMBER (*continued*).	£. s. d.	£. s. d.
Flooring Boards, sq. 1 in.—Prepared, first	0 9 0	0 13 0
Second	0 7 6	0 8 6
Other qualities	0 5 0	0 7 0
Cedar, Cuba.....foot	0 0 3½	0 0 4
Honduras, &c.	0 0 3	0 0 4
Australian	0 0 3	0 0 3½
Mahogany, Cuba	0 0 5	0 0 7½
St. Domingo cargo av.	0 0 5½	0 0 7½
Mexican ,,	0 0 4	0 0 5
Tobasco cargo av.	0 0 4	0 0 6½
Honduras cargo av.	0 0 4½	0 0 6½
Rose, Rio .....ton	7 0 0	17 0 0
Bahia	6 0 0	15 0 0
Satin, St. Domingo .....ft.	0 0 8	0 1 0
Porto Rico	0 0 8	0 1 3
Walnut, Italian	0 0 4	0 0 5
METALS.		
IRON—Pig in Scotland .....ton	2 2 6	0 0 0
Bar, Welsh, in London	4 15 0	5 2 6
,, in Wales	4 7 6	4 12 6
,, Staffordshire, London	6 0 0	7 0 0
Sheets, single, in London	7 10 0	9 0 0
Hoops ,,	6 5 0	7 5 0
Nail-rods ,,	6 0 0	7 0 0
COPPER—		
British, cke. and ingt. .....ton	43 0 0	44 10 0
Best selected	44 0 0	45 0 0
Sheets, strong	52 0 0	0 0 0
,, India	48 0 0	48 10 0
Australian, fine cash	0 0 0	0 0 0
Chili, bars ,,	39 10 0	39 17 6

METALS (*continued*).	£. s. d.	£. s. d.
YELLOW METAL.....lb.	0 0 4½	0 0 4½
LEAD—Pig, Spanish	11 5 0	0 0 0
English, com. brands	11 10 0	0 0 0
SPELTER—		
Silesian, special .....ton	14 5 0	14 7 6
Ordinary brands	14 0 0	14 5 0
TIN—		
Straits	91 15 0	92 5 0
Australian	92 2 6	92 12 6
English ingots	94 0 0	0 0 0
TINPLATES—		
IC coke .....box	0 15 6	0 17 0
IX ditto	1 1 6	1 5 0
IC charcoal	0 17 6	1 0 0
IX ditto	1 6 0	1 7 0
OILS.		
Linseed .....ton	23 0 0	23 10 0
Cocoanut, Cochin	31 0 0	0 0 0
Ceylon	27 10 0	27 15 0
Copra	26 10 0	0 0 0
Palm, Lagos	29 10 0	30 0 0
Palm-nut Kernel	26 10 0	0 0 0
Rapeseed, English pale	25 0 0	0 0 0
,, brown	23 0 0	0 0 0
Cottonseed, refined	20 5 0	22 0 0
Tallow and Oleine	25 0 0	45 0 0
Lubricating, U.S.	7 0 0	10 0 0
,, Refined	8 0 0	15 0 0
TURPENTINE—		
American, in cks. .....cwt.	1 5 6	1 6 0
TAR—Stockholm .....brl.	0 19 6	1 0 0
Archangel	0 11 6	0 12 0

COMPETITIONS AND CONTRACTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
New Offices	Stretford Local Board	30*l.*, 20*l.*, and 10*l.*	Dec. 5th	ii.
New Law Courts	Birmingham Corportn.	Not stated	Not stated	ii.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Making-up Streets	Wandsworth Bd. of Wks	*Official*	Nov. 10th	ii.
Kerbing, Paving, and Other Works	Hendon Local Board	do.	Nov. 11th	ii.
Underground Urinals, &c., Eastcheap	Com. of Sewers	do.	Nov. 13th	ii.
Dispensary, Woodbridge	Govns. Seckford Hospitl, &c., Schools	do.	Nov. 14th	ii.
Construction of Branch Line, Barnstaple	Great Western Ry. Co.	do.	Nov. 17th	ii.
Bridge, Tydu	do.	do.	do.	ii.
Kerbing and Asphalting Footpaths, &c.	Tottenham Local Board	— De Pape	do.	ii.
Aqueduct, Thirlmere	Manchester Corporatn	G. H. Hill	do.	ii.
Tiling Walls of Kitchen at Workhouse	Lambeth Guardians	*Official*	Nov. 18th	ii.
Sluice-Cocks Air-Valves, &c.	Northwich Local Board	H. Bancroft	Nov. 21st	ii.
Altering and Adding to existing Copper Plates	Liverpool Corporation	*Official*	do.	xx.
Wrought-Iron Girders, &c.	do.	do.	do.	xx.
Pipe Sewers, &c.	Romford U. R. S. A.	Brundell, Simmons, & Co	Nov. 30th	ii.
Iron Pier, Lee-on-the-Solent		E. A. Robinson	Dec. 5th	ii.
Erection of Farm Buildings	Glamorgnshre Lun. Asy.	J. Giles & Gough	Dec. 8th	ii.
Iron and Glass Buildings	Folkestone Exhbtn, 1886	Jos. Gardner	Not stated	xx.
Rebuilding Three Houses		W. Stevens	do.	ii.

TENDERS.

BLACKHEATH.—For the erection of two shops and premises at Tranquil Vale, Blackheath, for Messrs. Hinds & Price:—

Rennard Bros. (accepted)	£1,200 0 0

BRISTOL.—For the erection of new Sunday schools in connexion with the Broadmead Baptist Chapel. Mr. Herbert J. Jones, architect, Bristol:—

	Pitch Pine Fittings.	Red Deal Fittings.
H. J. Williams	£2 347 16 0	£2,287 16 0
W. E. Walters	2,225 0 0	2,200 0 0
E. T. Hatherley	2,127 0 0	2,120 0 0
H. A. Horse	2,000 0 0	1,988 0 0
F. Williams	1,997 0 0	
Cowlin & Son	1,925 0 0	1,875 0 0
Eastbrook & Sons	1,870 0 0	1,816 0 0
J. James	1,859 0 0	1,759 0 0
Stephens & Bastow	1,799 0 0	1,759 0 0
J. Bastow	1,790 0 0	
Wilkins & Son	1,777 0 0	1,750 0 0
E. Clarke	1,774 0 0	1,732 0 0
W. Church	1,749 0 0	1,717 0 0
G. Humphreys	1,736 0 0	1,701 0 0
A. Krauss	1,735 0 0	
J. E. Davis	1,726 0 0	1,720 0 0
H. J. Rossiter	1,724 0 0	1,676 0 0
J. H. Brown	1,700 0 0	1,665 0 0
J. Wilkins	1,690 0 0	1,680 0 0
Walters & Son	1,640 0 0	1,647 0 0
A. J. Bevan	1,640 0 0	1,670 0 0
T. R. Lewis*	1,444 0 0	1,444 0 0

[All of Bristol.]
* Accepted conditionally.

BRISTOL.—For rebuilding fronts of Nos. 39 and 40, Wine-street, for Mr. Walter Verrier. Mr. Herbert J. Jones, architect, Bristol:—

G. Humphreys, Bristol	£820 0 0

[No competition.]

BRISTOL.—For sanitary and decorative works at Wimbledon House, Whiteladies-road. Mr. Herbert J. Jones, architect, Bristol:—

J. R. Cridland, Bristol	£183 7 0

[No competition.]

CAMBERWELL.—For the erection of a cottage at Wells-street, Camberwell. Mr. Willis, architect:—

J. A. Taylor	
King	£259 0 0
Smith	235 0 0
	210 0 0

CAMBERWELL.—For the erection of new stabling, Peckham-road, for Mr. T. Tilling. Messrs. H. Jarvis & Son, architects:—

Nichols	£2,414 2 3½
J. & J. Greenwood	2,285 0 0
Canning & Mullins	2,197 0 0
Lawrance & Sons	2,190 0 0
Burman & Son	2,033 0 0
Parker	1,977 0 0
Marsland	1,934 0 0
Outhwaite & Son	1,872 0 0

CATFORD.—For an addition at No. 11, The Mount, Blythe Hill, Catford, for the London Provident Building Society. Mr. Willis, architect:—

Sykes	£215 0 0
Chard	212 0 0
J. A. Taylor	209 0 0

CLERKENWELL.—For the reinstatement of Nos. 28 and 29, Great Bath-street, Clerkenwell, after damage by fire. Mr. Robert Willey, architect, Ludgate-hill:—

Hayward	£450 0 0
Bealby	390 0 0
Larter (accepted)	360 0 0

EDMONTON.—For the execution of the jobbing work for the Local Board for three years. Mr. G. E. Eachus, surveyor:—

G. Bell, Tottenham, accepted at a schedule of prices.

EXETER.—For new theatre, Exeter. Mr. C. J. Phipps, F.S.A., architect. Quantities by Mr. G. R. Tasker:—

Phillips, Exeter	£6,387 0 0
Pollard, Taunton	6,333 0 0
Stephens & Bastow, Bristol	6,299 0 0
Gibbard, Exeter	6,250 0 0
Moass & Son, Exeter	6,250 0 0
Gibson, Exeter	6,222 0 0
Scadding, Exeter	6,200 0 0
Commings, Exeter	5,900 0 0
Clarke, Plymouth	5,762 0 0
Bevan, Plymouth*	5,505 0 0
Special Stage Gas Work.	
Strode & Co.*	182 0 0
Fibrous Plaster, Box Fronts, &c.	
Jackson & Sons*	208 0 0

[Exclusive of upholstery, papering, gilding, and decorating.]
* Accepted.

FINSBURY.—For the erection of a public-house at Finsbury, for Mr. Fordham:—

Voller	£2,161 0 0
Dove Bros.	2,095 0 0
Harris, Old-street (accepted)	1,995 0 0

HASTINGS.—For erecting the East Sussex, Hastings, and St. Leonards Hospital, at Hastings. Messrs. Young & Hall, architects. Quantities by Mr. Morgan H. Young:—

	A.	B.	C.	Total.
Taylor Bros., Hastings	£25,251	£1,100	£450	£26,801
Dove Bros, London	24,975	1,125	425	26,525
J. Kenwood, St. Leonards	23,600	1,060	460	25,120
C. Hughes, St. Leonards	23,200	1,037	415	24,652
Grover & Son, London	23,002	1,018	417	24,437
Punnett & Sons, Tonbridge	22,558	1,071	406	24,035
P. Jenkins, St. Leonards	21,960	1,020	420	23,400
Perry & Co., London	21,967	1,014	402	23,383
Rodda, Hastings	21,962	966	394	23,322
L. H. & R. Roberts, London	21,894	1,031	372	23,297
Eldridge & Cruttenden, Hastings	20,555	910	420	21,885
H. L. Holloway, London*	19,634	895	258	20,787

A. Hospital. B. Boundary walls, fences, and gates. C. Sun rooms.
* Accepted, subject to certain alterations, reducing the amount to about 14,500*l.*

HOLLOWAY.—For repairs to the Royal Caledonian Asylum, Holloway. Mr. Alexander Peebles, honorary architect. No quantities:—

Killby & Gayford	£314 0 0
C. H. Cole	296 0 0
McCormick & Sons	256 0 0

KENSINGTON.—For alterations to Nos. 95 and 97, High-street, Kensington. Mr. Alexander Peebles, architect. Quantities by Mr. W. E. Stoner:—

Clarke & Bracey	£4,592 0 0
Nightingale	4,443 0 0
G. Bowles	4,197 0 0
Brass & Son	3,623 0 0
J. Morter	3,493 0 0
Killby & Gayford	3,333 0 0
C. F. Kearley	3,099 0 0

LEE (Kent).—For the erection of schools and class-rooms to Congregational Church, Lee, Kent. Mr. J. H. Seth Smith, architect, Lincoln's Inn:—

Good	£2,065 0 0
Havill	1,810 0 0
Jerrard	1,775 0 0
Rennard Bros. (accepted)	1,734 15 0

LONDON.—For alterations in forming dry area at Infirmary, Hoxton-street, for the Guardians of St. Leonard's, Shoreditch. Mr. F. T. Smith, architect:—

Cox	£325 0 0 !
Arnold	160 0 0
Robson	149 0 0
Ivory	145 0 0
Dicksee & Dicksee	145 0 0
Martin	139 13 0
Sharp	125 0 0
Reason	124 0 0
Linfield	124 0 0
Whicker	123 0 0
Doubleday	120 0 0
Deacon	119 0 0
Harbrow	112 0 0
Feary	110 0 0
Swan & Co.	102 0 0
King	101 12 6
Stevens	98 10 0
Lyne	96 14 0
B. Walker	87 0 0
Forrest (accepted)	75 10 0 !

LONDON.—For cooking apparatus and boilers at the workhouse and infirmary, St. George's-in-the-East. Messrs. Wilson, Son, & Aldwinckle, architects:—

Clements, Jeakes & Co.	£3,654 0 0
Waller	3,361 0 0
Christie	3,311 0 0
Bradford	2,789 0 0
May	2,690 0 0
W. J. Fraser & Co.	2,680 0 0
J. F. Clarke	2,565 0 0
Fraser & Fraser	2,542 0 0
Berry & Sons (accepted)	2,180 0 0

LONDON.—For pulling down and rebuilding No. 2, Bond-court, Walbrook. Mr. Alexander Peebles, architect. Quantities by Mr. W. E. Stoner:—

		Credit old materials.
Clarke & Bracey	£10,902	£50
Hall, Beddall, & Co.	10,822	40
J. & J. Greenwood	10,369	25
E. Lawrance	10,112	20
E. Conder	9,995	35
Killby & Gayford	9,956	35
Mowlem & Co.	9,918	
Colls & Sons	9,817	20
C. Cox	9,798	20
Patman & Fotheringham	9,783	46
Brass & Son	9,688	100
M. Gentry	9,652	30
B. E. Nightingale	9,596	40
J. Morter	9,337	40

LONDON.—For repairs to the Church of St. Mary-at-Hill, City. Mr. Alexander Peebles, architect. No quantities:—

Colls & Sons	£745 0 0
J. & J. Greenwood	598 0 0
Harrison & Spooner	573 16 0
Killby & Gayford	530 0 0
Dove Bros.	395 0 0

LONDON.—For works to the City of London Militia Barracks, City-road. Mr. Alexander Peebles, architect. No quantities:—

B. E. Nightingale	£856 0 0
J. Woodward	768 0 0
J. & J. Greenwood	627 0 0
J. C. Ramsey	597 14 6
Killby & Gayford	578 0 0
McCormick & Sons	512 0 0

LONDON.—For alterations to No. 91, Old-street, St. Luke's. No quantities. Mr. W. D. Church, architect, South-place, Finsbury:—

Godden	£339 0 0
Taylor	270 0 0
Gill	237 0 0
Canham & Rickards	232 16 0
Sabey (accepted)	200 0 0

LONDON.—For the erection of a boys' school and large hall in Approach-road, Victoria Park, for the Governors of the Parmiter Charity. Messrs. T. Chatfeild Clarke & Son, architects. Quantities by Messrs. Leonard & Clarke:—

	Schools.	Hall.	Total.
G. Beale	£7,865 10	£2,333 10	£10,199
Wood Bros.	7,543 0	2,455 0	9,998
Toten Bros.	7,465 0	2,440 0	9,905
Thomerson & Son	7,150 0	2,470 0	9,620
Jackson & Son	7,100 0	2,424 0	9,524
Lawrance & Sons	7,049 0	2,288 0	9,337
Grover & Son	6,882 0	2,339 0	9,221
J. T. Chappell	6,877 0	2,257 0	9,134
T. Boyce	6,858 0	2,245 0	9,102
Hall, Beddall, & Co.	6,810 0	2,250 0	9,060
Perry & Co.	6,792 0	2,203 0	8,995
W. Shurmur	6,642 0	2,340 0	8,982
J. Morter	6,729 0	2,243 0	8,972
B. C. Nightingale	6,647 0	2,197 0	8,844
Brown, Son, & Blomfield	6,620 0	2,180 0	8,800
C. Cox	6,450 0	2,150 0	8,600

LONDON.—For alterations, &c., at the Crooked Billet Tavern, Crooked-lane, E.C., for Mr. Chown. Mr. Geo. Treacher, architect, Carter-lane:—

Pinnor	£416 0 0
Parker	365 0 0
B. Cook	363 0 0
Hulett	360 0 0

LONDON.—For building new mortuary in the parish of St. Bride, Fleet-street, E.C. Mr. Basil Champneys, architect:—

Morley	£165 0 0
Nightingale	143 0 0
B. Cook (accepted)	135 0 0
Drew	123 0 0
Deighton	116 0 0

LONDON.—For alterations and repairs to the Old King's Head Tavern, 282, Euston-road, N.W., for Mr. T. D. Spurgin. Mr. Arthur W. Saville, architect, Strand. Quantities supplied:—

R. & J. Shiers	£825 0 0
S. R. Lamble	735 0 0
S. Godden	735 0 0
J. Heath	687 0 0
Ward & Lamble	666 0 0
Spencer & Co.	660 0 0
J. Walker	647 0 0
B. Cook (accepted)	631 0 0

PENTONVILLE.—For altering nine houses, Chapel-street, Pentonville, into shops, for Captain Gordon Moir. Mr. E. P. Loftus Brock, architect:—

Batchelder	£2,213 0 0
Macdonald	1,978 3 9
Allard	1,770 0 0
Bamford	1,750 0 0
Brown	1,742 0 0
Goy	1,676 0 0
Haynes	1,625 0 0
Mattock Bros.	1,591 0 0
Brown & Harris	1,590 0 0
Poole	1,588 0 0
Roberts	1,449 0 0

STAINES.—For whitewashing and cleaning paint at the Ashford District School, near Staines, for the Managers of the West London School District:—

J. Wood & Co.	£249 0 0
Proctor	230 0 0
Cogswell & Co.	218 0 0
B. Walker	213 0 0
Lillie	198 0 0
Dicksee & Dicksee (accepted)	198 0 0

WESTON-SUPER-MARE.—For new esplanades, retaining and sea walls, roads, terraces, &c., and fencing. Mr. T. J. Scoones, A.M.I.C.E., engineer, Bristol. Quantities by Mr. A Barratt, Corn-street, Bristol:—

F. T. Hammett, Bridgewater	£7,500 0 0
H. A. James, Westminster	5,460 0 0
G. Dyer, Weston-super-Mare	5,450 0 0
W. Cowlin & Son, Bristol	5,433 0 0
A. Krauss, Bristol	5,166 0 0
J. Durnford & Son, Bristol	5,131 0 0

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C. Walmsley, Manchester	£37,541 7 7
Scott & Edwards, Birmingham	36,895 0 0
Anwell, Dipson, & Wainwright, Liverpool	34,370 0 0
Innes & Wood, Birmingham	32,126 0 0
Currall & Lewis, Birmingham	32,000 0 0
Vernon & Co., London	31,968 0 0
Jevons & Son, Dudley	31,252 0 0
Trow, Sons, & Fereday, Wednesbury	31,180 0 0
A. Krauss, Bristol	29,490 0 0
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G. Law, Kidderminster*	26,900 0 0
A. Palmer, Birmingham	26,486 0 0

* Accepted. The lowest schedule.

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TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

F. G.—E. S. B.—R. B.—C. D. (thanks).—G. & M.—J. R.—W. W. & Son (thanks for your letter).—J. W.—J. A. T.—H. A. G. (sketches received).—J. T. jun.—J. H. G. (drawings received).—"Local Public Works" (next week).—S. A. (below our mark).—J. F. (should send amount).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

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Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

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Addressed to No. 46, Catherine-street, W.C.

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